

Botulinum toxin: The use in dermatology and other specialities

The name “Botulism” is derived from the Greek word “botulus”, which means sausage. Early outbreaks of botulism was thought to be caused by the consumption of sausages, thereby leading to food poisoning, blurred vision, dizziness and may progress to deadly paralysis. In 1895 the bacteria producing botulinum toxin was identified and named Clostridium botulinum. This led to the identification of the seven serotypes, of which the type A is used for cosmetic purposes. Drs J & A Carruthers identified its use for cosmetic purposes in 1988 and since then, it has been tested and used for several applications.

All types of botulinum toxin have the same mechanisms of action. Type A is the most potent of them and acts at the neuromuscular junction (NMJ). By acting on the SNARE proteins, the toxin prevents the fusion of the acetylcholine vesicles (that transmits the nerve impulse) to the membrane of the presynaptic neuron. This leads to a non-functional muscle. After the injection of the toxin, it takes around 1-7 days for it to show an effect and the effect can last for several months.

There are many products in the market these days, some being more superior in certain aspects. Most come in a powder form and need to be kept refrigerated. Once constituted, it needs to be used as soon as possible, for it to have the best possible effect. This toxin is injected subdermal and systemic absorption is negligible.

The use for botulinum toxin in dermatology has revolutionised the cosmetic industry throughout the world. It is used to treat rhytides and generally to make the patient look younger. Several muscle groups can be treated with this toxin and knowing the facial anatomy can be very helpful for the person doing the injections. Basically botulinum will lead to paralysis of the targeted muscles, thus injecting the wrong muscle can lead to the opposite effect to that desired. The most common sites injected are in the upper third of the face. The glabella lines, the “crow’s feet”, eyebrow shaping are most commonly treated and have excellent results with the botulinum toxin. One has to learn and know the different sites of injection and the expectation of the patient. With time, the muscles treated, atrophy and the rhytides become less obvious. One can inject as many times as one desires and only rarely that one becomes resistant to the treatment.

Other areas of the face that can also benefit are the “bunny” line, the “gummy” smiles, “smoker’s” lines and also the lifting the angle of the mouth. The “bunny” lines are basically the creases that form on the side of the upper nose when one laughs and can be exaggerated in some people. With time, some wrinkle lines appear and it tends to become permanent. As for “gummy” smiles, the upper lip elevates higher than normal in few individuals. This not only reveals their upper teeth, but also the upper gums become exposed. Most people do not appreciate that look and do benefit from the injection of botulinum toxin to improve it.

One does not need to be a smoker to develop deep vertical lines (called “smoker’s lines” on the nasolabial region. Some peri-oral muscle hypertrophies with time and this leads to the wrinkly look above the upper lip. Most elderly women hate this and seek help to improve the condition. Botulinum toxin will bring back the balance in that muscle group, however the deep creases may need to be further corrected with lasers and fillers.

Apart from cosmetic use, botulinum toxin is commonly used for the treatment of localised hyperhidrosis. Excessive sweating begins in childhood or in the teenage years and adversely affects the lifestyle of the person, leading to low self-confidence and social withdrawal. Though there are many different substances and lotions in the market, the injection of botulinum toxin tends to normalise the sweating quicker and lasts up to a year. It is highly effective with minimal side-effects. Typical areas that benefit from it are the axillae, palms, soles, scalp and forehead.

New uses for botulinum toxin are constantly emerging and various specialities are recognising its use. It is being used to treat chronic anal fissures, headaches, essential tremors, cerebral palsy, post-stroke spasticity, many types of sphincters, oesophageal achalasia, vaginismus, facial asymmetry and even to improve depression. The basic science for the use of this toxin is to block the action of hyperactive muscles. This can restore the balance between flexors and extensors or the dilators and constrictors, thereby improving the abnormality. Some dermatologist and plastic surgeons also use it before procedures to improve the approximation of tissues after excision and thus decreasing scar formation.

There are very few side-effects from the use of botulinum toxin. The amount used for cosmetic purposes is minimal and there have never been any cases of botulism. However there have been a couple of cases when large amounts are used to treat big muscle groups for patients with neurological disorders. These occurred mainly with the use of more than 200u of botulinum type B toxin. Patients receiving doses of more than 200u are at increased risk of developing neutralising antibodies, which makes them resistant to treatment with the toxin. However, such high doses are rarely used for cosmetic purposes. Bruising, muscle weakness and brow ptosis do occur from time to time and can be limited with good technique.

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