Indications and Limitations for the Use of Botulinum Toxin for the Treatment of Facial Wrinkles

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Abstract. Botulin toxin is a strong blocking agent which has shown great usefulness in a variety of neuromuscular disorders related to hypertonicity and spasticity. Since 1992 it has been used in the attenuation of facial wrinkles. In this article we describe the different applications in the upper third, middle third, and lower third of the face, as well as the platysmal bands of the neck. We emphasize the use of this procedure for the upper third of the face. Limits are indicated when it is used on the middle and lower parts of the face. The author has found excellent results in the attenuation of wrinkles of the neck region.

Key words: Botulinum toxin — Facial wrinkles — Botox

Introduction

Plastic surgeons have tried for many years to find a harmless, non-surgical method to correct periorbicular, glabellar, and frontal wrinkles. Wrinkles are known to be a consequence of the natural aging process. They result from three factors; age, influenced by photoaging, gravity, which favors the breakdown of elastic fibers, and the action of the muscles of expression, which accentuates all kinds of wrinkles. Broadly speaking, there are two types of wrinkles; those due to aging and those due to hyperkinesis.

Wrinkles due to aging can be treated by any of the classic procedures; conventional lifting, chemical peeling, mechanical dermal abrasion, and any of the usual resorbable and non-resorbable materials normally injected to fill up the wrinkles.

Wrinkles due to expression or hyperkinesis must to be corrected in a different way as they result from facial gestures and cannot be attenuated by simply stretching the skin.

Guided by publications from the United States and Canada, we have used botulinum toxin, commonly known as Botox, since January 1997 [1].

Innumerable scientific papers have demonstrated the safety and efficacy of this method. The doses used are lower than those applied in ophthamology and neurology. The method has produced satisfactory results and the experience has generally been positive [2].

The considerations essential for satisfactory results are; precise indications, adequate dosing, good knowledge of anatomy and function, and a careful technique.

Pharmacology

Seven serotypes of botulin toxin have so far been purified. Serotype A is the most potent and is marketed in the United States and the United Kingdom.

Botulinum toxin is a protein that inhibits the release of acetylcholine from the pre-synaptic neuron at the neuromuscular junction thereby producing chemical denervation and muscle relaxation or paralysis selectively for a specific muscle. The paralysis is temporary, as the nerve will be slowly replaced by neurogenesis within six to eight months of the injection.

Toxicity is expressed in units. One unit is the amount of toxin with LD50 for 18–20 g Webster mice.

Physiology

The mechanism of acetylcholine secretion inhibition has three stages; absorption into the neuron, binding
to pre-synaptic neuronal receptors, and invasion of the acetylcholine vesicles thus inhibiting neurotransmission with the consequent paralysis of the adjacent muscle.

Almost simultaneously, reinervation begins to take place and this is almost totally complete within six months of the injection.

Immunology

Account should be taken of immune resistance—a lesser clinical response to re-injection as a consequence of the development of antibodies. Botulinum toxin is a protein. As such, it is capable of inducing the production of circulating antibodies which neutralize its action. In ophthalmology and particularly in neurology, where Botox is used for correcting neuromuscular dystonias such as blepharospasm and severe torticollis at larger doses of up to 1200 U, immune resistance has not exceeded 5%. When used in aesthetic medicine for cosmetic purposes, the percentage of immune resistance is zero.

Materials and Methods

Since January 1997, 400 patients have been injected with Type A botulinum toxin (Botox) in the upper third of the face, 20 patients in the middle and lower thirds of the face, and 65 patients have been injected in the neck. The dose ranged from 50 to 100 units per session per patient. The dose has been modified ac-

Glabellar Wrinkles

Many attempts have been made to obtain satisfactory results with less invasive methods than a direct approach to the corrugator muscles, the superciliary