Lower lid entropion correction using botulinum toxin

Corrección de entropión en párpado inferior con toxina botulínica

José E. Telich-Tarriba¹, Alejandra Martínez-Schulte², Ayhdé Grajeda-Gómez², Alejandro Barquet-Fuentes³ and José Telich-Vidal*¹

¹Departamento de Cirugía Plástica y Reconstrutiva, Hospital General Dr. Manuel Gea González; ²Médico Cirujano, Escuela de Medicina, Universidad Panamericana; ³Departamento de Oftalmología, Hospital Ángeles Pedregal; ⁴Profesor Titular de Cirugía Estética, Facultad Mexicana de Medicina, Universidad La Salle/Hospital Ángeles Pedregal, Ciudad de México, México

Abstract

Introduction: Entropion is defined as an inversion of the lower lid border, it may have several etiologies; however, the most common form of presentation is associated with the aging process. This clinical condition is mostly relevant due to the ophthalmological and aesthetic complications it may unleash. Surgical procedures are the standard form of management. Nevertheless, several factors may hinder their use. For this reason, minimally invasive or temporary procedures have been developed to treat this deformity, and among them, the use of botulinum toxin has been reported. Case Report: We present the case of an 82-year-old female diagnosed with involutional entropion who rejected any surgical procedures. After failing conservative measures, 12 units of botulinum toxin were applied in the lower lid, obtaining resolution of the entropion for a period of 16 weeks. Discussion and Conclusion: Botulinum toxin is a viable, accessible, and effective alternative for the temporary management of involutional entropion, especially in patient who do not wish to or cannot be subjected to surgical procedures.

Key words: Botulinum toxin. Entropion. Lower lid.

Resumen

Introducción: El entropión se define como la inversión del borde palpebral, el cual puede tener múltiples etiologías, sin embargo la forma más habitual de presentación es la asociada al proceso de envejecimiento. Esta condición adquiere relevancia debido a las complicaciones oftalmológicas y estéticas que puede desencadenar. Las intervenciones quirúrgicas son las modalidades estándar de tratamiento, sin embargo, varios factores pueden obstaculizar su aplicación. Por esta razón se han desarrollado procedimientos temporales y de mínima invasión para aliviar los síntomas y reducir las complicaciones, entre ellos el uso de la toxina botulínica. Caso clínico: Presentamos el caso de una mujer de 82 años con diagnóstico de entropión involucitivo quien rechazó el tratamiento quirúrgico, por lo que se llevó a cabo la aplicación de 12 unidades de toxina botulínica A en el párpado inferior, obteniendo resolución del cuadro durante 16 semanas. Discusión y conclusiones: La toxina botulínica es una alternativa viable, accesible y eficaz para el manejo temporal del entropión, especialmente en pacien- tes que no deseen o puedan ser candidatos a procedimientos quirúrgicos.

Palabras clave: Toxina botulínica. Entropión. Párpado inferior.
Introduction

Entropion is defined as an abnormal position of the eyelid, in which there is an inversion of the eyelid margin, which leads to continuous rubbing between the eyelashes and the cornea or the bulbar conjunctiva. Entropion can be congenital, cicatricial, spastic, or associated with the aging process (senile or involutive), the latter being the most common form of presentation in the lower eyelid1.

The pathophysiology of involutional entropion is complex; it has been postulated that it is caused by the combination of tissue changes associated with age-related degenerative processes, being the most important features horizontal and vertical laxity of the lower eyelid, predominance of the preseptal section over the pretarsal section of the orbicular muscle, enophthalmos, and degenerative changes of the tarsal plate. Clinically, patients present a deep inferior fornix, a lower lid margin higher than normal, and a decrease in the range of motion of the lower eyelid when looking downward1-3.

The relevance of entropion lies on its incapacitating symptoms, which can range from mild eye discomfort to corneal ulceration, bacterial keratitis, corneal vascularization, and loss of vision, as well as the esthetic alterations that it induces4.

The definitive treatment is surgical; however, in some occasions, due to the surgical risk or the rejection of invasive procedures by the patient, minimally invasive alternatives have been sought, among which the use of botulinum toxin type A is one of the most frequent3-4.

We present the case of a patient with entropion of the lower eyelid with successful results after the application of botulinum toxin.

Case report

We present the case of an 82-year-old female with a 3-week history of epiphora, photophobia, and foreign body sensation in the right eye. Physical examination revealed conjunctival hyperemia, keratitis, and inversion of the lower eyelid, without corneal ulcerations (Fig. 1).

The patient was diagnosed with involutive entropion; however, she refused surgical treatment and was therefore unsuccessfully treated with lubricants and a nocturnal eye patch. Due to the lack of improvement, the plastic surgery service of our institution was consulted and the application of botulinum toxin type A was proposed as a measure for temporary correction of entropion.

A total of 12 units of toxin were applied (Botox®, Allergan Inc., USA) subcutaneously over the pretarsal section of the orbicular muscle in the right eye, at 4 locations 3 mm below the eyelid margin.

One week later, the patient presented resolution of entropion, with eversion of the palpebral margin and without contact between the eyelashes and the eyeball (Fig. 2); the effect lasted 16 weeks, after which the entropion reappeared gradually, leading to apply a new dose of botulinum toxin A. There were no complications or adverse effects.

Discussion

Although surgery continues to be the gold standard for the correction of entropion2, corneal complications can develop during the waiting period for the surgical procedure, so conservative measures have been developed to avoid them, such as the use of eye lubricants, temporary occlusion with patches, and the use of botulinum toxin14.5, which has emerged as a viable alternative, especially for patients who are not candidates or refuse invasive procedures3.

Botulinum toxin A is an exotoxin produced by Clostridium botulinum, an anaerobic Gram-positive bacillus. Its mechanism of action consists in the creation
of a flaccid paralysis, by inhibiting the release of acetylcholine in the neuromuscular plate\textsuperscript{3,6}. The toxin was used for the first time by Scott et al., in 1973, in patients with strabismus; subsequently, it was approved by the FDA for the treatment of upper eyelid retraction, aberrant regeneration of the facial nerve, hypersecretion of the lacrimal gland, dry eye syndrome, and dynamic facial wrinkles, among others\textsuperscript{7}.

The use of botulinum toxin in the management of involutional entropion was described for the first time in 1988 by Clarke et al.; since then, small series have been reported with satisfactory results. Theoretically, entropion resolution is achieved by exerting action on the preseptal section of the orbicularis without affecting tarsal laxity and the lower eyelid retractor\textsuperscript{4}. The recovery of muscle action occurs due to axonal sprouting and the formation of new neuromuscular junctions\textsuperscript{5}.

In the case of our patient, a non-surgical treatment was proposed for the clinical improvement of signs and symptoms by means of the application of botulinum toxin A directly on the hypertrophic orbicularis muscle. It was demonstrated that the effect of the toxin improves the skin fold and the rubbing of the eyelashes to the cornea disappears gradually, from the 1\textsuperscript{st} week to the 4\textsuperscript{th} month as one would expect, since it has been reported that the flaccid paralysis that botulinum toxin A induces starts between 24 and 48 h with a peak between 7 and 10 days and with a duration of 12-15 weeks\textsuperscript{3,4,8-10}.

One of the advantages of this procedure is simplicity, since it is a short, relatively simple, minimally invasive procedure and with few complications described (lagophthalmos, ectropion or entropion, functional epiphora due to failure of the lacrimal sac, diplopia and hematoma of the eyelid); furthermore, it does not cause long-term changes in the morphology of the orbicular muscle\textsuperscript{4,7,10}. Such is the case of our patient who did not present any complication or adverse reaction.

**Conclusions**

Botulinum toxin is a viable, accessible, and effective alternative for the temporary management of entropion, especially in patients who do not wish or are not candidates for surgical procedures. In this way, the likelihood of corneal complications is reduced, and symptom relief is achieved.

**Ethical responsibilities**

- **Protection of human or animal subjects.** The authors declare that the procedures fulfilled the ethical standards of the relevant human experimentation committee and in accordance with the World Medical Association and the Declaration of Helsinki.
- **Data confidentiality.** The authors declare that they have followed the protocols of their institution on the publication of patient data.
- **Privacy rights and informed consent.** The authors declare that they have obtained the informed consent of the patients and/or subjects referred to in the article. This document is in the possession of the correspondence author.

**Funding**

The author did not receive funding to prepare this article.

**Conflict of interest**

The author declares no conflict of interest.

**References**