

Beyond the aesthetic purposes of the botulinum toxin A; The dry eye syndrome with essential blepharospasm

Abstract

Botulinum A toxin injection is a method used in clinical conditions such as blepharospasm, hemifacial spasm, strabismus, migraine, hyperhidrosis, torticollis and migraine, in addition to its use for cosmetic purposes. It works by reducing the release of acetylcholine at the neuromuscular junction, and as a result, a type of paralysis occurs in the applied area for a while.

Botox applied around the tear collection ducts can provide dual benefits by reducing tear loss and relieving blepharospasm.

In this study, botulinum toxin A injection was applied to 33 patients with essential blepharospasm and also dry eye syndrome. Schirmer test measurement, tear breakup time (BUT) and rose bengal disappearance test were measured before the injection and at the 1st week, 1st month and 3rd month after the injection. At the same time, sampling was performed for impression cytology before the injection and at the 1st and 3rd months after the injection. Symptoms and signs of blepharospasm decreased in all patients treated with botulinum toxin A. However, the patients' Schirmer test measurements were measured immediately one week after the injection and decreased in other measurements. Tear breakout time (BUT) increased in the 1st week after the injection but decreased in the 4th week measurements. Rose bengal disappearance score increased in the 1st week after injection and returned to its previous state in the 4th week. As a result of impression cytology, no change in conjunctival cell morphology was observed before and after injection. In conclusion, essential blepharospasm and dry eye are two independent diseases, but they can occur simultaneously. Botulinum toxin A injection is a very effective method in the treatment of blepharospasm. Although it has been stated in different studies that it has a positive effect on dry eye syndrome, it was observed that it did not have such an effect in our study.

Keywords: essential blepharospasm, dry eye syndrome, lacrimal gland, botulinum toxin

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Introduction

The Botulinum toxin A is a bacterial toxin obtained from the *Clostridium botulinum*.

This toxin has a particular anticholinergic effect on the neuromuscular junction of the affected area.

But however, this paralytic toxic effect can be used to treat the patients who have blepharospasm, facial muscular spasm, strabismus, migraine headache, excessive perspiration, wryneck. In addition to these conditions, it also can be used for some cosmetic purposes.¹ Essential blepharospasm is a focal dystonic muscular disorder which can cause severe uncontrollable contractions and movements in eyelid, eyebrow and even in the frontal area. The patients who suffer from blepharospasm may also dry eye syndrome commonly with decreased Schirmer test results.²

These uncontrollable excessive spasmodic contractions of the peri orbital muscles can cause an increased tear drainage and dryness in the eye. This loss of the tear can be treated by the Botulinum toxin A injections to this area.^{3,4}

Material-method

In this study, we evaluated the effect of standard periorbital botulinum toxin A injections on the tear functions and ocular surface morphologies in 33 patients who have essential blepharospasm and dry eye syndrome.

The mean age of patients was 59 years old and 14 of these were males.

Their medical history about the blepharospasm was between 6 months and 10 years long. No one was included on the study who had been applied botulinum toxin injection for the last six months. Before the study all of the participants had been examined by a neurologist for the contraindications or the other controversial conditions.

The botulinum toxin A (Dysport, Ipsen Biopharm, UK) as in the total 120 units was applied per participant.

The first portion of the total amount was as 0.2 ml=40 units into the upper and lower temporal facial area, and the additional amount was as 0.1 ml=20 units into the upper and lower lid areas.

To evaluate the dry eye symptoms a questionnaire was conducted to all patients before and after the injection.

According to the questionnaire the patients were divided into 4 groups as no dry eye, mild dry eye, moderate dry eye, and severe dry eye.

Tear break-up time (BUT), rose bengal disappearance score, and Schirmer test were measured in the patients before the injection, one week, one month, and three months after the injection. The Schirmer test was measured without local anesthesia with a 5 mm x 30 mm paper strip. The strip was placed on the outer 2/3 of the lower fornix and waited for 5 minutes. The measurements less than 5

mm were considered as dry eye. BUT was measured by instilling the fluorescein-impregnated strip into the lower fornix and breaking of tear was monitored by the same physician through the slit-lamp biomicroscopy. The measurements less than 5 seconds were considered as dry eye. The rose bengal disappearance score was performed by instilling one drop of rose bengal into the lower fornix. According to the Van Bijsterveld scoring system, a score less than 3.5 points were considered as dry eye.

Impression cytology was performed before the injection, one month and three months after the injection. The tissue samples were taken from the upper and lower bulbar conjunctiva. The scoring was done using the Ocular Surface Disease Index (OSDI, Allergan Inc.). The 0-7 points were considered as normal cell morphology, 8-14 as mild pathology, 15-21 as moderate pathology, and 22-30 as severe pathology.

Results

The study was conducted on 33 patients, 14 of them male and 19 were female. The mean age of the patients was 59 (35-84) years old.

Their essential blepharospasm duration was between 6 months and 10 years.

According to the dry eye questionnaire their subjective evaluation, 15 patients showed no change in complaints, 12 patients had increased complaints, and 6 patients had decreased complaints.

The results of the study were evaluated statistically according to the chi square test.

The BUT (tear break-up time) values were found increased in the end of the first week and first month after the injection ($p < 0.05$) but then it decreased to the baseline value at the time of 3 months.

The Schirmer test results were found decreased at first week, first month, and three months after the injection, but the changes were not statistically significant ($p > 0.05$).

The rose bengal staining test scores were also found increased at first week ($p > 0.05$), but later it decreased to the beginning levels.

The impression cytology analysis showed normal epithelial cell morphology in 5 patients, mild squamous epithelial cell metaplasia in 11 patients, and moderate squamous epithelial cell metaplasia in 17 patients (Table 1).

Table 1 Impression cytology analysis

	Schirmer test (mm)	BUT (saniye)	Rose bengal disappear score	IC score
Pre	8.6	4.2	3.2	10.4
1. Week	8	5.9	4.2	
1. Month	8.1	5.7	3.8	11.1
3. Month	7.9	4.3	3.5	12.4

Discussion

Essential blepharospasm is a progressive and devastating condition caused by involuntary contractions of the eyelid and surrounding muscles (orbicular oculi, corrugator, and procerus). The involuntary eye blinks and uncontrollable spasmodic contractions of the muscles around the ocular area affect the patients physically and psychologically.

So many patients with essential blepharospasm have also dry eye syndrome.

However, it is quite difficult to say whether the dry eye is caused by the blepharospasm or whether it occurs independently in those patients.

As it has been known, the more blinking procures the more stable tear film layer. The injection of the Botulinum toxin A into the lower eyelid area causes paralysis in this part of the orbicular muscle and insufficient lacrimal pumping function and reducing the tear drainage. The amount of the lacrimation and the number of eye blinks are two important factors affecting the lacrimal drainage capacity.⁵⁻⁷

In a study by Park DI et al. on 23 patients, the BUT and Schirmer test results were reported as increased after the botulinum toxin A injection. In our study, the BUT (tear break-up time) was measured as increased but the Schirmer test was found as decreased.⁸

The lacrimal drainage capacity decreases with age. Because of this reason the botulinum toxin A injection can be more effective for reducing the tear drainage. The corneal exposure reflex that occurs after the injection may cause tearing.

On the other hand, botulinum toxin A affects the autonomic nervous system directly as well as an anticholinergic agent. It reduces the glandular secretion of saliva, sweat and tear besides a moderate mydriasis and accommodation paralysis.⁹

Kocabeyoğlu et al. found in a study of 13 patients that tear break-up time and Schirmer test time increased, and impression cytology score decreased. Horwath-Winter et al. found in a study of 16 patients that tear break-up time increased, Schirmer test decreased, rose bengal disappearance score increased, and impression cytology score did not change after botulinum toxin A injection. These findings are similar to our study.^{10,11}

Conclusion

Essential blepharospasm and dry eye are two independent diseases, but they can be seen simultaneously. The botulinum toxin A injection is a highly effective method in the treatment of blepharospasm. Although the previously reported healing effects, the botulinum toxin A infection did not show a significant difference in statistically dry eye.

Acknowledgments

None.

Conflicts of interest

The author declares that there is no conflict of interest.

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