Botulinum Toxin Treatment for Upper Lid Retraction of Dysthyroidism

WANICHA CHUENKONGKAEW, MD*

Abstract

Six patients with upper eyelid retraction due to dysthyroidism at Siriraj Hospital received subcutaneous botulinum toxin treatment at a dosage of 5-20 units per injection. Five patients experienced an improvement in the lid retraction lasting at least 40 months and 3 patients required more than one injection. Botulinum toxin injection is an alternative treatment for the upper eyelid retraction of dysthyroidism, which is effective and causes minimal side effects, particularly in patients with euthyroid status.

Key word : Botulinum Toxin, Upper Eyelid Retraction, Dysthyroidism

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Upper eyelid retraction and dysthyroid ocular myopathy are common eye manifestations in dysthyroidism, which usually result in proptosis and exposure keratitis. Instead of conventional surgical treatment of upper eyelid retraction by levator palpebrae superioris muscle recession or müller muscle resection[1,2], botulinum toxin injection of the levator muscle is an alternative procedure to provide a protective ptosis preventing keratitis[3,4].

This study was proposed to determine the effectiveness of botulinum toxin treatment for upper lid retraction of dysthyroidism.

* Department of Ophthalmology, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok 10700, Thailand.

MATERIAL AND METHOD

Six patients with dysthyroidism who refused surgical treatment for upper lid retraction at Siriraj Hospital between 1997 and 1999 were recruited to receive subcutaneous botulinum toxin injected into the levator muscle.

The method used for botulinum toxin injection was as follows:-

1. Botulinum toxin preparation

One hundred units of botulinum toxin were mixed with 2 ml of normal saline without preservative. The concentration of the solution was 5 units per 0.1 ml.

2. Evaluation of the degree of upper eyelid retraction

The distance between upper limbus and upper eyelid margin of the patients sitting in an upright position was measured in millimetres.

3. Dose and size of injection

A dose of 5-20 units of botulinum toxin per injection was administered locally with tetracaine eye drops. The injection was given subcutaneously at the lateral one-third of the superior tarsal border (pars cartilaginosa) of the upper eyelid into the insertion of the levator palpebrae superioris muscle (Fig. 1). Further botulinum toxin injections were administered if there was a clinically inadequate response within one month.

RESULTS

Six patients with upper eyelid retraction due to dysthyroidism including 1 man and 5 women were treated. Their ages ranged from 28 to 51 years (mean = 35 years). Four patients (patient 1, 2, 4 and 6) received botulinum toxin injection within one year of the onset of dysthyroidism while patient 5 and 3 had treatment 2 and 3 years after the onset of symptoms respectively. All patients except patient 2 were euthyroid at the time of botulinum toxin treatment. The degree of upper eyelid retraction ranged from 2 to 3 millimeters.

In five (patients 2-6) of 6 patients, there was an improvement in upper eyelid retraction after botulinum toxin treatment with a follow-up period of at least 40 months (Fig. 2). Three patients (patients 1-3) required more than 1 injection with an interval between each injection of 1 to 3 months. Patient 1 who received 9 injections, altogether showed no improvement of her upper eyelid retraction (Table 1). Patient 1, 2 and 3 had minimally dry eyes after treatment.

DISCUSSION

Botulinum toxin is one of the most potent neurotoxins, acting by blocking acetylcholine release at the neuromuscular junction, resulting in temporary paralysis of the levator palpebrae superioris muscle. Due to the fact that there is no antagonist muscle, injection of the levator muscle produces a longer lasting muscle weakness than if the other extraocular muscles were injected.

In the present study, 5 of 6 patients with upper eyelid retraction showed an improvement after botulinum toxin treatment for at least 40 months, although 3 patients required more than 1 injection. Only 1 patient who was later diagnosed as having Graves' disease, was hyperthyroid at the time of injection, however, she was euthyroid 2 months after treatment.

Scott et al reported a long-lasting improvement in 2 of 3 patients with upper eyelid retraction treated with botulinum toxin and a temporary effect in the third patient. Some patients in their study also required multiple injections[5]. It is possible that repeated injections into the muscle may produce permanent dysmorphic alteration in the preterminal axon of the muscle fiber or irreversible neurogenic muscle

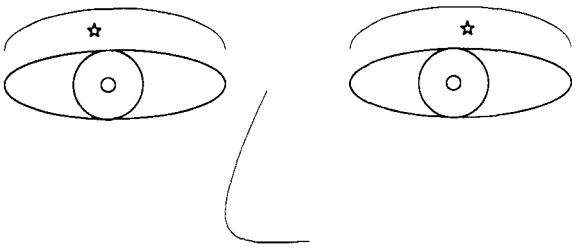

Fig. 1. Shows the site of botulinum toxin injection for upper eyelid retraction.

☆ shows site of injection.

Fig. 2. shows pre-injection (left) and post-injection (right) of botulinum toxin for upper eyelid retraction in patient 2.

Table 1. Patient characteristics and results of botulinum toxin treatment.

No.	Age/sex	Dysthyroidism		Laterality	Degree of lid retraction (mm)	Injection			Follow-up time (months)
		Status	Duration (months)			No.	Interval (months)	Dose (unit)	
1	29/F	Euthyroid	4	Left	3	9	1-2	5-20	60
2	28/F	Hyperthyroid	3	Right	3	3	1-3	5-15	60
3	35/F	Euthyroid	36	Left	3	2	1	10-20	66
4	35/F	Euthyroid	6	Both	2,2	1,1	-	5,5	50
5	51/M	Euthyroid	24	Left	2	1	-	5	48
6	31/F	Euthyroid	8	Left	2	1	-	7,5	40

atrophy with resulting muscle fibrosis and muscular scarring.

Ebner demonstrated a good result in 5 of 6 patients with upper eyelid retraction with a follow-up period of 3 years and euthyroid patients experienced a long-lasting effect(6). Moreover, Biglan and Ozkan et al described benefit in 2 and 4 (of 6 patients) patients respectively(7,8).

However, the patients in the present study received a larger dosage of botulinum toxin than in previous studies, which might be due to the difference in the duration of thyroid disease and racial origin of the patients. Although botulinum toxin injection may cause pain and swelling at the injection site, dry eye, epiphora, overptosis, or double vision, patients in the present study experienced only slightly dry eyes.

Uddin et al have recently showed good results using botulinum toxin injection for upper eyelid retraction *via* a subconjunctival approach in 11 patients(9). Nevertheless, a prospective randomized comparatve study is needed to determine the most appropriate method of botulinum toxin injection for upper eyelid retraction.

In conclusion, botulinum toxin injection is an alternative treatment for upper lid retraction of dysthyroidism, which is effective and causes minimal side effects, particularly in patients with euthyroid status.

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การฉีดสารชีวพิษโบทูลินในผู้ป่วยโรคของต่อมธัยรอยด์ที่มีภาวะหนังตาบนถูกดึงรั้ง

*วณิชา ชื่นกองแก้ว, พบ**

การศึกษาการฉีดสารชีวพิษโบทูลิน ในผู้ป่วยโรคของต่อมธัยรอยด์ที่มีภาวะเปลือกตาบนถูกดึงรั้ง ที่คณะแพทยศาสตร์ศิริราชพยาบาล จำนวน 6 ราย พบว่าให้ผลดีในผู้ป่วยจำนวน 5 รายที่ได้ติดตามผลการรักษาเป็นเวลาอย่างน้อย 40 เดือน และผู้ป่วยที่ได้รับการฉีดสารนี้มากกว่า 1 ครั้งมีจำนวน 3 ราย โดยใช้สารชีวพิษโบทูลิน ขนาดตั้งแต่ 5-20 ยูนิต สรุปว่าการฉีดสารชีวพิษโบทูลิน เพื่อรักษาผู้ป่วยโรคของต่อมธัยรอยด์ที่มีภาวะเปลือกตาบนถูกดึงรั้งแทนการผ่าตัด เป็นวิธีที่ให้ผลดีโดยเฉพาะอย่างยิ่งถ้าผู้ป่วยได้รับการรักษาโรคของต่อมธัยรอยด์จนอยู่ในภาวะ euthyroid และยังทำให้เกิดผลข้างเคียงเพียงเล็กน้อย แม้ว่าบางรายอาจจะต้องฉีดมากกว่า 1 ครั้ง

คำสำคัญ : สารชีวพิษโบทูลิน, ภาวะหนังตาบนถูกดึงรั้ง, โรคของต่อมธัยรอยด์

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* ภาควิชาจักษุวิทยา, คณะแพทยศาสตร์ศิริราชพยาบาล, มหาวิทยาลัยมหิดล, กรุงเทพ ฯ 10700