Botulinum A Toxin Treatment for Blepharospasm and Meige Syndrome : Report of 100 Patients

NIPHON POUNGVARIN, M.D., F.R.C.P. (LONDON)*, VORAPUN DEVAHASTIN, M.D., M.R.C.P. (UK)*, RUNGSUN CHAISEVIKUL, M.D.*, NARAPORN PRAYOONWIWAT, M.D.*, ADULYA VIRIYAVEJAKUL, M.D., F.R.C.P. (LONDON)*

Abstract

One hundred patients (9.09 per cent) with blepharospasm from a grand total of 1,100 patients (at the Movement Disorders Clinic at Siriraj Hospital) who had been treated with botulinum A toxin (BTX-A) injection between 1989 and 1996 were analysed. The 100 patients comprised 65 females and 35 males with a female to male ratio of 1.86:1. Their mean age was 53.3 years (S.D. 12.03). Sixty patients had idiopathic blepharospasm, 31 patients were diagnosed with Meige syndrome (blepharospasm plus oromandibular dystonia) and nine patients with segmental dystonia (Meige syndrome plus cervical dystonia). The mean duration of suffering was 39.22 months (S.D. 44.83). Each patient received 30-50 IU of BTX-A injections according to the standard Siriraj injection pattern. Nine patients were lost to follow-up.

The results of BTX-A injection were classified as: excellent result (an improvement of more than 75 per cent) in 83.51 per cent; a good response (an improvement of 50-75 per cent) in 13.19 per cent; a moderate response (an improvement of 25-50 per cent) in 2.20 per cent; and minimal or no response in 1.10 per cent. The complications of BTX-A injection were transient minimal ptosis (9.89 per cent), transient double vision (1.10 per cent) and excessive lacrimation (1.10 per cent). The efficacy of BTX-A injection lasted one to two months in 1.10 per cent, two to three months in 23.08 per cent, three to four months in 45.05 per cent, four to five months in 16.48 per cent, five to six months in 4.40 per cent and more than six months in 9.89 per cent.

Botulinum A toxin injection is a simple and effective out-patient treatment for patients with blepharospasm, causing no systemic side-effects and minor transient local complications. The only drawback of this treatment is its high cost (100 IU cost 300 US dollars).

Blepharospasm, the repetitive involuntary sustained contractions of the orbicularis oculi, is now categorised as a neurological disease. Idiopathic blepharospasm invariably begins in adult life, most commonly in the sixth or seventh decade. The sex ratio is two to three women to one man. The earliest symptoms are often sensory. The eyes or eyelids are sore gritty or itching and may feel

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

dry or sometimes water excessively[1]. Photophobia is prominent and may predate other symptoms by many years. The initial symptoms may date from a specific episode of eyelid inflammation, infection or other interference with ocular surface dynamics[2].

The spasms may extend into the mid-facial and lower facial muscles (Meige syndrome) and occasionally to the jaw and neck. Rarely, the spread is reversed from the lower facial muscles to the orbicularis oculi[3]. Diagnostic confusion as to the presence of lower facial dystonia may arise, since patients often used stereotyped voluntary movements of the lower face, such as mouth opening, to facilitate eye opening.

The lids may appear to be passively shut but resist opening by the examiner's fingers. This clinical picture (formerly known erroneously as apraxia of eye opening or levator inhibition) may also be seen in Parkinson's disease and progressive supranuclear palsy[4].

The cause of blepharospasm remains elusive; the condition may occur in patients with symptomatic dystonia, generalized idiopathic dystonia and Parkinson's disease. Pretarsal blepharospasm may also be seen in progressive supranuclear palsy. The facial tics of Tourette's syndrome may occasionally include sustained spasms of eye closure. There is therefore a suspicion that the underlying abnormality in idiopathic blepharospasm is in the extrapyramidal system. Blink reflex studies suggest that the facial nucleus is hyperexcitable and fails to habituate to repeated stimuli, possibly because of disinhibition[5]. Saccadic eye movement abnormalities compatible with extrapyamidal dysfunction have been described[6]. Results of neuro-imaging and postmortem studies are normal, and a defect of neurotransmission appears likely. However, positron emission tomography scanning is inconclusive, and there is no consistent response to pharmacological treatment.

Botulinum toxin type A (BTX-A) has been used in the treatment of blepharospasm since 1983. Results have been reported for more than 5,000 patients worldwide. This substance has proved to be effective in controlling involuntary spasms of the eyelids in a number of neuromuscular disorders, most notably essential blepharospasm, hemifacial spasm and myokimia[7-13]. Certainly the most important effect of BTX-A is its ability to chemodenervate cholinergic striated muscles[14-17]. BTX-A is now known to work through a presynaptic block of the neuromuscular junction. The drug is taken up at special receptors on the presynaptic terminal and internalized, resulting in an intracellular blockade of neurotransmitter release. This effect appears to be permanent, and recovery of neuromuscular function occurs through nerve sprouting and new terminal formation[18-21]. This neuromuscular blockade is the clinically desired effect in the management of facial dyskinesias and the reason for treatment. During the relatively denervated stage, the target muscle is weakened, resulting in reduced contractility and relief of dystonic movement.

In Thailand, BTX-A injection has been available for treatment of various movement disorders since January 1989 at Siriraj Hospital. The efficacy of BTX-A injection for Thai patients with hemifacial spasm, writer's cramp, spasmodic torticollis and various movement disorders has been reported as good[22-26]. The objective of this study is to evaluate the efficacy of BTX-A injection in Thai patients with blepharospasm and Meige syndrome, and to study the clinical spectrum of these conditions.

PATIENTS AND METHOD

The data bank of the Movement Disorders Clinic, Siriraj Hospital, Mahidol University, Bangkok, Thailand for the period 1989-1996 was analysed. A grand total of 1,100 Thai patients were treated during that period with BTX-A injections for various indications. One hundred patients (9.09 per cent) were diagnosed as having blepharospasm or Meige syndrome, based on history, physical examination and a natural history of their condition. A complete neurological examination and a routine complete physical examination were done for every patient. None of the patients underwent computerised tomography of the brain and magnetic resonance imaging except those who had those tests done prior to the attendance of our clinic. The duration of follow-up of each patient ranged from six months to six years and no evidence was found of abnormal neurological findings apart from blepharospasm.

Botulinum A toxin was injected into the subcutaneous tissue around the eyelids of both sides as shown in Fig. 1. As in the case of Meige syndrome, additional BTX-A injections were given around the angles of the mouth. The total amount

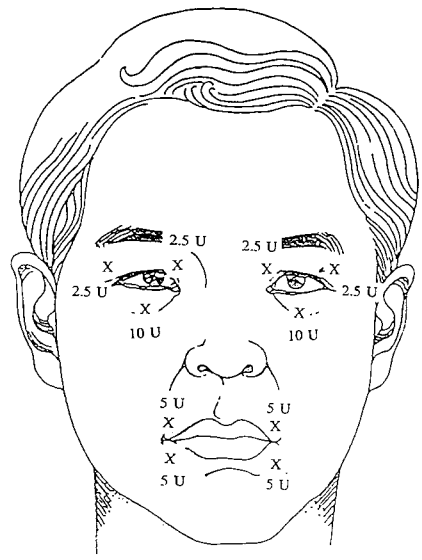

Fig. 1. Siriraj pattern of botulinum A toxin injection for blepharospasm and Meige syndrome.

and sites of BTX-A injections were recorded as 30-50 international mouse unit (hereafter, IU) (Fig. 1). BTX-A was supplied initially by the Smith-Kettlewell Eye Research Institute, San Francisco (1989-1992) and later by Allergan Incoporation, California (1992-1996). BTX-A was prepased 30 minutes prior to the injection and never used later than six hours after preparation to ensure its efficacy. The follow-up schedule for each patient was two weeks, one month, two months, and then every month after the injections for assessment of the outcome.

Clinical data of 100 patients with blepharospasm or Meige syndrome were analysed for demographic data, including sex, age, residence, duration of illness, site, amount, outcome and frequency of BTX-A injections. Statistical analyses were expressed as a mean with standard deviation (S.D.) and percentage as appropriate.

RESULTS

Of the 1,100 patients treated with BTX-A iniections at Siriraj Hospital between 1989 and 1996, 100 patients were diagnosed as having blepharospasm or Meige syndrome. These 100 patients comprised 65 females and 35 males with a female to male ratio of 1.86 : 1. Their ages ranged from 9-76 years, with a mean of 53.3 years (S.D. 12.03), mode 61 years, whereas 63 patients (63 per cent) were aged between 50-69 years. The age distribution of all patients is tabulated in Table 1. Sixty patients (60 per cent) were diagnosed as having idiopathic blepharospasm, 31 patients (31 per cent) with Meige syndrome and nine patients (9 per cent) with segmental dystonia (Meige syndrome plus cervical dystonia).

Table 1. Age group distribution of 100 patients with blepharospasm

Age group (years)	Number	Percentage
< 20	2	2
20 - 29	1	1
30 - 39	9	9
40 - 49	20	20
50 - 59	30	30
60 - 69	33	33
70 - 79	5	5
Total	100	100

Of the 100 patients, 74 were from the Central region of Thailand including 37 from Bangkok, 10 were from the South, nine were from the North-East, six were from the North and one was a foreigner. Several associated conditions were revealed prior to treatments: hypertension (17 patients), hand tremor (13), history of severe head injury (9), diabetes mellitus (7), previous eyelid surgery (6), stroke (3), posterior fossa craniotomy (2), Parkinson's disease (2), post-Bell's palsy (1) and gout (1).

The duration of suffering from blepharospasm in each patient before BTX-A injection ranged from 1 to 192 months, with a mean duration of 39.22 months (S.D. 44.83). The distribution of duration of illness before BTX-A injection is given in Table 2.

Table 2. The distribution of duration of illness in 100 patients with blepharospasm before BTX-A toxin injection

Duration	Number	Percentage
1 - 6 months	21	21
6 - 12 months	3	3
1 - 2 years	24	24
2 - 5 years	30	30
5 - 10 years	11	11
10 - 15 years	8	8
15 - 20 years	3	3
Total	100	100

Nine patients (9 per cent) were lost to follow-up. Analyses of the remaining 91 patients revealed that excellent results (an inprovement of more than 75 per cent) were achieved in 76 patients (83.51 per cent); a good response (an improvement of 50-75 per cent) in 12 patients (13.19 per cent); moderate response (an improvement of 25-50 per cent) in two patients (2.20 per cent); and minimal or no response (an improvement of 1-25 per cent) in one patient (1.10 per cent). Complications from the BTX-A injections were reported in 11 patients (12.09 per cent), with transient minimal ptosis (less than two weeks duration) in occurring in nine patients (9.89 per cent), transient double vision (less than one week duration) in one patient (1.10 per cent), and excessive lacrimation (for two days) in one patient (1.10 per cent).

The amount of BTX-A injection which was recorded at each treatment, ranged from 30 to 50 IU. The number of injections received by each patient were varied from one to a maximum of 19 injections, with a mean number of injections of 4.71 times (S.D. 4.45) during the duration of follow-up from six months to six years. The efficacy of BTX-A injection lasted one to two months in one patient (1.10 per cent), two to three months in 21 patients (23.08 per cent), three to four months in 41 patients (45.05 per cent), four to five months in 15 patients (16.48 per cent), five to six months in four patients (4.40 per cent) and more than six months in nine patients (9.89 per cent). The details concerning the duration of efficacy of treatment are given in Table 3.

Table 3. Duration of efficacy of BTX-A treatment in 91 patients with blepharospasm

Durtion of efficacy (weeks)	Number	Percentage
6	1	1.10
8	16	17.58
10	4	4.40
11	1	1.10
12	39	42.86
14	2	2.20
16	13	14.28
18	2	2.20
20	4	4.40
Over 24	9	9.89
Total	91	100

DISCUSSION

Blepharospasm is a focal dystonia which appears mainly in women, usually in the sixth decade. The cause is unknown. The clinical spectrum of Thai patients with blepharospasm is similar to that found in westerners, (i.e., more prevalent in females), with a female to male ratio of 1.86 to 1. The mean age of onset in Thai patients was lower (53.3 years; S.D. 12.03) compared with British patients (55.8 years; S.D. 12.5)[1]. Blepharospasm very often was associated with dystonia elsewhere, principally involving the cranial-cervical area. Sixty

per cent of Thai patients were diagnosed as idiopathic blepharospasm, whereas 31 per cent were diagnosed as Meige syndrome (blepharospasm plus oromandibular dystonia), and 9 per cent as segmental dystonia (Meige syndrome plus cervical dystonia). The study of 264 patients with blepharospasm from the UK revealed associated oromandibular dystonia in 71.2 per cent and neck dystonia in 22.7 per cent[1].

Most cases of blepharospasm had no other identifiable disease. In earlier years, blepharospasm was often attributed to psychiatric illness or psychological disorders. However, only a minority of patients have overt psychiatric illness prior to the onset of blepharospasm. In our series there was no associated psychiatric illness. However, several associated conditions were identified: hypertension (17 per cent), hand tremor (13 per cent), a history of severe head injury (9 per cent), diabetes mellitus (7 per cent), previous eyelid surgery (6 per cent), stroke (3 per cent), posterior fossa craniotomy (2 per cent), Parkinson's disease (2 per cent), post-Bell's palsy (1 per cent) and gout (1 per cent).

A therapeutic response in blepharospasm to different kinds of drugs is estimated to occur in only one in five of all patients. Many drugs have been claimed to relieve blepharospasm, but there is no consistent pharmacological response. Anticholinergic drugs probably offer the best chance of benefit, but side-effects are common and the response is inconsistent[27,28]. Different surgical approaches have been tried to relieve blepharospasm. Bilateral avulsion of facial nerves has been the most successful, producing initial improvement in more than 90 per cent of the patients[29,30]. Unfortunately, recurrences were frequent (75 per cent), occurring on average one year after surgery, although not as disabling as the original illness. Muscle stripping of the orbicularis oculi was initially successful in only 25 per cent of patients so treated[31,32]. Other surgical approaches, such as alcohol injections or thermolytic lesions of facial nerves, produced only temporary benefit[33].

Injection of BTX-A into the orbicularis oculi has recently been introduced as the treatment of choice for blepharospasm[7-13]. Botulinum neurotoxin binds to peripheral motor nerve terminals and inhibits the release of acetylcholine. The overall results of BTX-A therapy for blepharospasm have been gratifying, with 93.3 per cent of treated patients reporting a clinically noticeable decrease in spasm intensity[34]. All patients recover orbicularis oculi neuromuscular function over time, with a mean duration of benefit effect of 12.9 weeks. Of the 6.7 per cent of patients who do not experience improvement, the majority show only sporadic poor response. It is not uncommon for a patient to show little or no benefit from one treatment session, only to experience adequate response with subsequent injections. Some patients in the literature did not achieve control of spasms with the usual dose of 12.5 to 25 IU per eye but responded to higher doses in the range of 30 to 75 IU.

Our data revealed that excellent results (an improvement of more than 75 per cent) were achieved in 83.57 per cent, good response (an improvement of 50-75 per cent) in 13.19 per cent, and a moderate response (an improvement of 25-50 per cent) in 2.20 per cent. Only 1.10 per cent of the treated patients showed minimal or no response to BTX-A injection (total dosage of 30-50 IU). Complications arising from BTX-A injections in our series were reported as transient minimal ptosis (less than two weeks in duration) in 9.89 per cent, transient double vision (less than one week in duration) in 1.10 per cent, and excessive lacrimation (two days) in 1.10 per cent. The overall incidence of side-effects from BTX-A in the treatment of blepharospasm (from the literature of 5,383 patients) were ptosis (12.30 per cent), keratitis (4.3 per cent), epiphora (3.5 per cent), dry eye (2.5 per cent), diplopia (2.1 per cent), lid oedema (1.6 per cent), facial weakness (0.9 per cent), lagophthalmos (0.5 per cent), ecchymosis (0.3 per cent), entropion/ectropion (0.3 per cent), local pain (0.2 per cent), blurred vision (0.2 per cent) and facial numbness (0.1 per cent). These are usually considered to be "complications" although more properly some are expected and accepted as consequences of treatment.

Most of our patients (75.82 per cent) reported the duration of benefit from the effect of BTX-A injections lasted for more than three months (i.e., three to four months in 45.05 per cent; four to five months in 16.48 per cent; five to six months in 4.40 per cent; more than six months in 9.89 per cent). Only 1.10 per cent of patients reported the efficacy of BTX-A injection as only one to two months and 23.08 per cent of patients showed benefit which lasted for two to three months.

We adopted the standard injection sites and dosages of BTX-A injection for Thai subjects with blepharospasm (Fig. 1) and thus we established a Siriraj pattern of BTX-A injection. We avoided the midtarsal injection site because of the high risk of ptosis and we selected a very small dosage (2.5 IU) of BTX-A for injection over the pretarsal region of the medial and lateral canthus.

The overall results of BTX-A injection for blepharospasm and Meige syndrome in Thai patients, utilizing the total amount of 30-50 IU according to the Siriraj pattern of injection, are satisfactory with a high success rate and few transient complications. The only drawback of this treatment is its high cost (100 IU costs 300 US dollars). Each patient usually needs an average of three to four injections per year to control blepharospasm (i.e., at a cost of 300 US dollars per year).

(Received for publication on August 26, 1996)

REFERENCES

1. Grandas F, Elston JS, Quinn N, Marsden CD. Blepharospasm: A review of 264 patients. J Neurol Neurosurg Psychiat 1988; 51: 767-72.
2. Elston JS, Marsden CD. The significance of ophthalmological symptoms in idiopathic blepharospasm. Eye 1988; 2: 435-9.
3. Marsden CD. Blepharospasm-oromandibular dystonia (Brueghel's syndrome). A variant of adult onset torsion dystonia. J Neurol Neurosurg Psychiat 1976; 39: 1204-9.
4. Elston JS. A New variant of blepharospasm. J Neurol Neurosurg Psychiat 1992; 55: 369-71.
5. Berardelli A, Rothwell J, Day BL, Marsden CD. The pathophysiology of blepharospasm and oromandibular dystonia. Brain 1985; 108: 593-608.
6. Lueck CJ, Tanyeri S, Crawford TJ, Elsto JS, Kennard C. Saccadic eye movements in essential blepharospasm. J Neurol 1990; 237: 226-9.
7. Kraft SP, Lang AE. Botulinum toxin injections in the treatment of blepharospasm, hemifacial spasm, and eyelid fasciculations. Can J Neurol Sci 1988; 15: 276-80.
8. Cohen DA, Savino PJ, Stern MB, Hurtig HI. Botulinum injection for blepharospasm: A review and report of 75 patients. Clin Neuropharmacol 1986; 9: 415-29.
9. Engstrom PF, Arnoult JB, Mazlow ML, et al. Effectiveness of botulinum toxin therapy for essential blepharospasm. Ophthalmology 1987; 94: 971-5.
10. Dutton JJ, Buckley EG. Long-term results and complications of botulinum A toxin in the treatment of blepharospasm. Ophthalmology 1988; 95: 1529-34.
11. Elston JS. Long-term results of treatment of idiopathic blepharospasm with botulinum toxin injections. Br J Ophthalmol 1987; 71: 664-8.
12. Taylor JDN, Kraft SP, Kazdan MS, et al. Treatment of blepharospasm and hemifacial spasm with botulinum A toxin: A Canadian multicentre study. Can J Ophthalmol 1991; 26: 133-8.
13. Mauriello JA Jr, Coniaris H, Haupt EJ. Use of botulinum toxin in the treatment of one hundred patients with facial dyskinesias. Ophthalmolgy 1987; 94: 976-9.
14. Gundersen CB. The effects of E toxin on the synthesis, storage and release of acetylcholine. Prog Neurobiol 1980; 14: 99-119.
15. Simpson LL. Molecular pharmacology of botulinum toxin and tetanus toxin. Annu Rev Pharmacol Toxicol 1986; 26: 427-53.
16. Black JD, Dolly JO. Interaction of ^{125}I-labeled botulinum neurotoxins with nerve terminals. I. Ultrastructural autoradiographic localization and quantitation of distinct membrane acceptors for types A and B on motor nerves. J Cell Biol 1986; 103: 521-34.
17. Black JD, Dolly JO. Interaction of ^{125}I-labeled botulinum neurotoxins with nerve terminals. II. Autoradiographic evidence for its uptake into motor nerves by acceptor-medicated endocytosis. J Cell Biol 1986; 103: 535-44.
18. Duchen LW, Strich SJ, The effects of botulinum toxin on the pattern of innervation of skeletal muscle in the mouse. Q J Exp Physiol 1968; 53: 84-9.
19. Angaut PD, Molgo J, Comella JX, et al. Terminal sprouting in mouse neuromuscular junctions poisoned with botulinum type A toxin: Morphological and electrophysiological features. Neuroscience 1990; 47: 799-08.
20. Diaz J, Molgo J, Pecot-Dechavassine M. Sprouting of frog motor nerve terminals after longterm paralysis by botulinum type A toxin. Neurosci Lett 1989; 96: 127-32.
21. Holds JB, Alderson K, Fogg SG, Anderson RL. Motor nerve sprouting in human orbicularis mus-

cle following botulinum A injection. Invest Ophthalmol Vis Res 1990; 31: 964-7.
22. Poungvarin N, Viriyavejakul A. Two hundred and fifty patients with hemifacial spasm treated with botulinum toxin injection. J Med Assoc Thai 1992; 75: 199-03.
23. Poungvarin N. Writer's cramp: The experience with botulinum toxin injections in 25 patients. J Med Assoc Thai 1991; 74: 239-47.
24. Poungvarin N, Viriyavejakul A. Botulinum A toxin treatment in spasmodic torticollis: Report of 56 patients. J Med Assoc Thai 1994; 77: 464-70.
25. Poungvarin N, Devahastin V, Viriyavejakul A. Treatment of various movement disorders with botulinum A toxin injection: An experience of 900 patients. J Med Assoc Thai 1995; 78: 281-8.
26. Poungvarin N, Viriyavejakul A, Komoltri C. Placebo-controlled double-blind cross-over study of botulinum A toxin in hemifacial spasm. Parkinsonism and Related Disorders 1995; 1: 85-8.
27. Nutt JG, Hammerstad JP, DeGarmo P, Carter J. Cranial dystonia: double-blind cross-over study of anticholinergics. Neurology 1984; 34: 215-7.
28. Lang AE. High dose anticholinergic therapy in adult dystonia. Can J Neurol Sci 1986; 13: 42-6.
29. Talbot JF, Gregor Z, Bird AC. The surgical management of essential blepharospasm. In: Marsden CD, Fahn S, eds. Movement Disorders. London: Butterworths, 1982: 322-9.
30. McCord CD, Coles WH, Shore JW, Spector R, Putnam JR. Treatment of essential blepharospasm. I. Comparison of facial nerve avulsion and eyebrow-eyelid muscle stripping procedures. Arch Ophthalmol 1984; 102: 266-8.
31. Gillum WN, Anderson RL. Blepharospasm surgery. An anatomical approach. Arch Ophthalmol 1981; 99: 1056-62.
32. McCord CD, Shore J, Putnam JR. Treatment of essential blepharospasm. II. A modification of exposure for the muscle stripping technique. Arch Ophthalmol 1984; 102: 269-73.
33. Battista AF. Surgical approach to blepharospasm: nerve thermolysis. In: Marsden CD, Fahn S, eds. Movement Disorders. London: Butterworths, 1982: 319-21.
34. Dutton JJ. Acute and chronic effects of botulinum toxin in the management of blepharospasm. In: Jankovic J, Hallett M, eds. Therapy with botulinum toxin. New York: Marcel Dekker, Inc., 1994: 199-09.

การฉีดสารโบทูลินัมทอกซิน รักษาผู้ป่วยตากระพริบค้าง : รายงานผู้ป่วย 100 ราย

นิพนธ์ พวงวรินทร์, พ.บ., F.R.C.P. (London),*
วรพรรณ เทพหัสดิน ณ อยุธยา, พ.บ., M.R.C.P. (UK),*
รังสรรค์ ชัยเสวิกุล, พ.บ., นาราพร ประยูรวิวัฒน์, พ.บ.,*,*
*อดุลย์ วิริยเวชกุล, พ.บ., F.R.C.P. (London)**

คณะผู้วิจัยได้ทำการศึกษาเรื่องการฉีดสารโบทูลินัมทอกซิน รักษาผู้ป่วยตากระพริบค้างจำนวน 100 ราย (ร้อยละ 9.09) จากผู้ป่วยที่ได้มารับการรักษาด้วยวิธีนี้ทั้งสิ้น 1,100 รายจากคลินิกการเคลื่อนไหวผิดปรกติของโรงพยาบาลศิริราช ระหว่างปี พ.ศ.2532-2539. ผู้ป่วยเป็นหญิง 65 ราย ชาย 35 ราย คิดเป็นอัตราส่วนเพศหญิงต่อชาย 1.86:1 อายุเฉลี่ยของผู้ป่วยทั้งหมดเท่ากับ 53.3 ปี (ค่าความเบี่ยงเบนมาตรฐาน 12.03). ผู้ป่วยจำนวน 60 ราย เป็นโรคตากระพริบค้างอย่างเดียว, ผู้ป่วย 31 รายมีตากระพริบค้างร่วมกับมุมปากและคางขยับ (Meige syndrome) และผู้ป่วย 9 รายมีการเคลื่อนไหวของคอร่วมกับอาการตากระพริบค้างและมุมปากหรือคางขยับ (segmental dystonia). ระยะเวลาเฉลี่ยที่ผู้ป่วยเป็นโรคมานาน 39.22 เดือน (ค่าความเบี่ยงเบนมาตรฐาน 44.83). ผู้ป่วยแต่ละรายจะได้รับการฉีดสารโบทูลินัมทอกซินในขนาด 30-50 หน่วยสากล ตามรูปแบบมาตรฐานที่พัฒนาขึ้นที่โรงพยาบาลศิริราช (Siriraj pattern). มีผู้ป่วย 9 ราย ไม่สามารถติดตามผลการรักษาได้.

ผลการรักษาพบว่าร้อยละ 83.51 มีการตอบสนองดีเยี่ยม (อาการตากระพริบหายไปมากกว่า 75 เปอร์เซนต์), ร้อยละ 13.19 มีการตอบสนองดี (อาการตากระพริบหายไป 50-75 เปอร์เซนต์), ร้อยละ 2.20 มีการตอบสนองดีปานกลาง (อาการตากระพริบหายไป 25-50 เปอร์เซนต์) และร้อยละ 1.10 ไม่ตอบสนองต่อการรักษา. ผลแทรกซ้อนของการรักษาพบว่ามีอาการหนังตาตกชั่วคราวพบร้อยละ 9.89, เห็นภาพซ้อนร้อยละ 1.10 และน้ำตาไหลออกมากพบร้อยละ 1.10. ประสิทธิผลของการรักษาพบว่าฤทธิ์ยาอยู่ได้นาน 1-2 เดือนร้อยละ 1.10, นาน 2-3 เดือนร้อยละ 23.08, นาน 3-4 เดือนร้อยละ 45.05, นาน 4-5 เดือนร้อยละ 16.48, นาน 5-6 เดือนร้อยละ 4.40, และนานเกิน 6 เดือนร้อยละ 9.89.

โดยสรุปการฉีดสารโบทูลินัมทอกซินในการรักษาผู้ป่วยตากระพริบค้างนั้นเป็นวิธีที่ง่าย, ปลอดภัย, ได้ผลดี, โดยไม่มีผลแทรกซ้อนใด ๆ ที่เป็นอันตรายและสามารถใช้เป็นการรักษาแบบผู้ป่วยนอกได้. ผลเสียของการรักษาวิธีนี้คือราคายาที่แพงมาก กล่าวคือ 100 ยูนิตสากลราคา 300 เหรียญสหรัฐ

* สาขาวิชาประสาทวิทยา, ภาควิชาอายุรศาสตร์, คณะแพทยศาสตร์ศิริราชพยาบาล, มหาวิทยาลัยมหิดล, กรุงเทพมหานคร 10700