Botulinum Toxin Injection Into the Lacrimal Gland for Treatment of Proximal Nasolacrimal Duct Obstructions in Children

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ABSTRACT
The authors retrospectively evaluated the use of botulinum toxin injections to treat epiphora in children secondary to proximal obstruction of the nasolacrimal drainage system. Three patients (ages 8, 9, and 16 years) received botulinum toxin injections in the palpebral portion of the lacrimal gland. Two patients experienced symptomatic relief immediately following botulinum toxin injection. Both required subsequent injections, with an average symptomatic relief lasting 7 months. The only noted side effect was papillary conjunctivitis in one patient that resolved without treatment. The third patient was lost to follow-up. Although conjunctival dacryocystorhinostomy with Jones tube is the surgical procedure of choice for treating proximal lacrimal system obstruction, complication rates in children are high. Botulinum toxin injections provide a safe and effective alternative. [J Pediatr Ophthalmol Strabismus 2014;51:e75-e77.]

INTRODUCTION
Botulinum toxin has been available since the 1970s for treatment of strabismus and blepharospasm.1,2 The mechanism of action of botulinum toxin is the inhibition of the presynaptic release of acetylcholine at the neuromuscular junction. The duration of effect is variable, lasting 3 to 6 months with the ultimate return of normal muscle function.

Botulinum toxin injection into the lacrimal gland of adults for treatment of epiphora has been reported.3-5 Conditions include gustatory lacrimation, canalicular obstruction, and simple functional epiphora. An improvement of symptoms is reported to occur for an average of 12 to 16 weeks (range: 8 to 30 weeks). The treatment was reported to be safe, with only transient diplopia reported in a small number of patients.

The current study describes the results of using botulinum toxin injection in children with epiphora secondary to proximal obstruction of the nasolacrimal drainage system.

CASE REPORTS
A retrospective study was performed on 3 children diagnosed as having proximal lacrimal drainage obstruction and symptomatic epiphora. All patients received botulinum toxin injection in the palpebral portion of the lacrimal gland as their method of treatment.

Case 1
A 9-year-old boy had a history of punctal agenesis involving the upper and lower punctum of the left eye. He had chronic epiphora since birth and no
Case 1

A 12-year-old girl had a history of herpetic blepharitis at age 2 years. Since the herpetic infection, she had epiphora from the affected left eye. Past treatment included attempts to probe the upper and lower canalicular system under general anesthesia. Probing was unsuccessful due to adhesions within the canaliculus. The probe could not be passed into the lacrimal sac. The patient had surgical exploration of the lower canaliculus in which a cut down through the skin demonstrated no identifiable canalicular tissue.

Case 2

A 16-year-old girl had a history of herpetic blepharitis at age 2 years. Since the herpetic infection, she had epiphora from the affected left eye. Past treatment included attempts to probe the upper and lower canalicular system under general anesthesia. Probing was unsuccessful due to adhesions within the canaliculus. The probe could not be passed into the lacrimal sac. The patient had surgical exploration of the lower canaliculus in which a cut down through the skin demonstrated no identifiable canalicular tissue.

Case 3

An 8-year-old boy had a history of trauma to the left upper and lower eyelid. Surgical repair was performed at age 4 years. Because of the involvement of the nasolacrimal duct, a Crawford tube was placed at an outside facility. With removal of the Crawford tube, constant epiphora had been noted for the past 4 years.

Surgical Technique

All patients were injected with botulinum toxin reconstituted with sterile preservative-free 0.9% sodium chloride solution diluted to a concentration of 100 mg/mL. The lateral upper eyelid was everted to expose the palpebral portion of the lacrimal gland. An injection of 5 units of botulinum toxin was placed into the lacrimal gland using a 30-gauge needle (Figure 1). The two younger patients received general anesthesia for the injections; the 16-year-old patient was treated in the office with topical anesthesia.

RESULTS

Cases 1 and 2 experienced symptomatic relief immediately following botulinum toxin injection. Both required subsequent injections, with an average symptomatic relief lasting 7 months. Case 1 required three injections and Case 2 required two injections. Patient 1 developed papillary conjunctivitis following the injections that resolved without treatment. No other side effects were noted. Case 3 was lost to follow-up.

DISCUSSION

Proximal obstruction of the nasolacrimal drainage system is difficult. A conjunctival dacryocystorhinostomy with Jones tube placement is recommended as the surgical procedure of choice. However, this procedure is rarely performed in children because of the difficulties encountered. Good patient cooperation and compliance with the Jones tube are absolutely essential for surgical success. Complication rates of conjunctival dacryocystorhinostomy in children are significantly higher than in adults, with tube malposition and extrusion seen commonly.

Because of the success noted in adults who received botulinum toxin injections in the lacrimal gland for treatment of epiphora, this method of treatment was offered to children with proximal lacrimal drainage obstruction. The results reported herein demonstrate similar results in children as in adults. Botulinum toxin injection into the palpebral portion of the lacrimal gland was effective in eliminating epiphora in children with canalicular obstructions. As expected, the duration of effect is limited to approximately 7 months and repeat injections are necessary to control epiphora. Injections can be done under topical anesthesia in older cooperative children, but general anesthesia is necessary for younger patients. Although no significant complications were noted in our patient population, ptosis and temporary diplopia may be encountered.

In this limited number of patients, botulinum toxin injection of the lacrimal gland was effective for epiphora in children with canalicular obstruction and is a less invasive procedure, has rare complications, and requires less follow-up and virtually no
Botulinum toxin injection of the lacrimal gland should be considered as an alternative treatment for epiphora in patients with proximal lacrimal system obstruction. It should be noted that this is an off-label use of botulinum toxin and insurance reimbursement is unlikely before further studies are performed.

REFERENCES