A Pilot Study Evaluating the Treatment of Postparotidectomy Sialoceles With Botulinum Toxin Type A

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Objective: To report our experience in treating 4 cases of recurrent sialoceles with botulinum toxin type A after parotid surgery.

Design: This is a prospective, nonrandomized, nonblinded pilot study describing a new use for botulinum toxin type A.

Setting: Tertiary academic medical center.

Patients: Four patients (2 men and 2 women) with persistent postparotidectomy sialoceles who had undergone various treatment failures were included. The diagnosis was made by fine-needle aspiration of the mass based on well-recognized cytologic features of the entity, as well as an elevated amylase level and no evidence of tumor or infection.

Interventions: Sialoceles were aspirated before local injection of botulinum toxin type A (30-50 U) subcutaneously.

Main Outcome Measures: The patients were followed up 1 week after receiving botulinum toxin type A injection and then at monthly intervals. They were extensively questioned and examined for any evidence of side effects or recurrence.

Results: All patients had total resolution of sialocele or external salivary fistula within 1 month of treatment. None of the patients to date have demonstrated recurrences at 7 through 13 months, and there were no complications, particularly facial nerve weakness.

Conclusion: Our findings suggest that botulinum toxin type A offers a highly effective, safe, and noninvasive method of treatment in postparotidectomy sialocele.


Salivary gland sialoceles are well-known complications of parotid surgery. Although many are transient, others persist causing the patient cosmetic deformity and discomfort.1 Numerous treatments have been advocated, but none have been consistently successful. Aspiration is the most common therapy along with pressure dressings. Total parotidectomy and low-dose radiation therapy have been advocated for those cases unresponsive to repeated aspirations.2 Surgery in a previously operated on field risks facial nerve injury and may result in a second sialocele. Radiation therapy risks include mucositis and xerostomia. Anticholinergic drugs have many undesirable side effects including xerostomia, constipation, photophobia, tachycardia, and urinary retention.3 None of these modalities offer an effective treatment of the persistent sialocele with a reasonable degree of morbidity.

Botulinum toxin is one of the most powerful toxins known. A small taste of food containing the preformed toxin by Clostridium botulinum can be lethal. Poisoning leads to a symmetric pattern of muscular weakness resulting in respiratory arrest by diaphragm weakness and upper airway obstruction. Botulinum toxin was first used therapeutically in the early 1980s for the treatment of strabismus and now it has become the mainstay of nonsurgical treatment for such diseases as blepharospasm, spasmodic dysphonia, and lower esophageal achalasia.4 The basis for the use of the toxin in these neuromuscular conditions is that botulinum toxin binds to the presynaptic cholinergic nerve terminals, inhibiting the release of acetylcholine and paralyzing the muscle.

Recently botulinum toxin type A has been reported as effective therapy for Frey syndrome.5,7 The proposed mechanism in...
PATIENTS AND METHODS

This is a prospective nonrandomized, nonblinded study evaluating the use of botulinum toxin type A as a treatment for the postparotidectomy sialocele. All patients had undergone a superficial parotidectomy either by the senior author (S.M.P.) (patients 1 and 2) or by an outside surgeon and subsequently referred to the senior author (patients 3 and 4) (Table). The diagnosis was confirmed in all 4 patients by fine-needle aspiration of the mass based on well-recognized cytologic features of the entity as well as an elevated amylase level (>50 000 U/L) on the aspirate. Participants were under the care of one of us (S.M.P.) at the Albany Medical Center, Albany, NY, who described the risks and benefits of the various treatment options. All of the patients opted to receive an injection with botulinum toxin type A.

Application of botulinum toxin type A included local anesthesia with 1% lidocaine hydrochloride with 1:100 000 parts epinephrine amide injected subcutaneously over the sialocele. Any fluid from the sialocele was then aspirated. Botulinum toxin type A, 30 to 50 U, was then injected subcutaneously near the remaining mass. No dressing was used. Patient 4 developed a chronic salivary-cutaneous fistula after diagnostic aspiration. Botulinum toxin type A was injected directly in the region of the original sialocele.

Subjects were followed up 1 week after receiving the injection of botulinum toxin type A and then at monthly intervals (reference range, 7-9 months). At each visit, patients were questioned extensively for any evidence of recurrence of the sialocele or for a drug-related injury.

Four patients, 2 men and 2 women were included in this study. Their ages ranged from 36 to 68 years. All of these patients underwent superficial parotidectomy 1½ to 6 months before botulinum toxin type A therapy. All 4 had undergone multiple simple aspirations for treatment. One had a second surgical procedure (see “Case Illustration: Patient 3” section) and was considering radiation therapy when she was referred to our pilot study. All patients had more than 6 mL of fluid in the original aspirations before injection with botulinum toxin type A.

The patients reported no side effects. On physical examination these patients exhibited no facial nerve or individual muscle deficits. With monthly follow-up visits, no patient has had recurrence of their sialocele at 7 through 13 months. No further therapy has been necessary including reaspirations (Figure 1 and Figure 2).

CASE ILLUSTRATION: PATIENT 3

A 63-year-old woman underwent a right superficial parotidectomy by an outside surgeon for a Warthin tumor. On postoperative day 7 the patient was noted to have a sialocele. She underwent repeated aspirations with pressure dressings that resulted in reaccumulation of fluid. A surgical exploration of the area was performed with cauterezation of the remaining gland and acellular dermal graft (Transderm Scöp patch; LifeCell Corporation, Branchberg, NJ) placement. Postoperatively, she again developed drainage and was offered low-dose radiation for further therapy. She was then referred to our clinic 6 months after her original surgery where she underwent botulinum toxin type A injection (see “Patients and Methods” section) (Figure 2). Over the next 3 days the drainage resolved requiring no further therapy. She is symptomatic free at 13 months’ follow-up.

COMMENT

To our knowledge, this is the first report of botulinum toxin type A used to treat postparotidectomy sialocele in the world literature. Although some sialoceles regress on their own, others can be quite persistent. Based on our experience, botulinum toxin type A represents a safe and effective new therapy for the treatment of sialoceles especially those recalcitrant to conservative measures. It avoids the risks of surgery and radiation therapy and seems to reduce the need for repeated aspirations.

A deficiency of the study is the lack of a randomized control group. As stated earlier, most sialoceles will regress with time and only a small percentage will fail limited treatment. This series of patients is unique, however, because of the prolonged nature of the sialoceles that were unresponsive to many treatment modalities. All patients underwent multiple aspirations except 1 who developed a chronic salivary cutaneous fistula that was also unacceptable to the patient. All of the patients in this study responded to botulinum toxin type A injection within 1 week of receiving the initial injection.

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<th>Description of Patients</th>
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<tr>
<td>Patient No./Sex/Age, y</td>
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<tr>
<td>1/M/38</td>
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<td>2/F/52</td>
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<td>3/F/68</td>
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<td>4/M/36</td>
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*Number of aspiration attempts for therapy before receiving an injection of botulinum toxin type A.
†Duration of sialocele or fistula before receiving an injection of botulinum toxin type A.
Transient, mild paresis of the upper lip, loss of the nasolabial fold, and numbness of the upper cheek have been reported as complications of botulinum toxin type A injection near the parotid gland. None of the 4 patients in this study reported any of these symptoms. We attribute this difference to the area of injection. Because botulinum toxin type A affects the end nerve synapse, medial injections near the facial neuromuscular terminals will result in higher paresis. Injection closer to the nerve trunk has much less effect on facial musculature. Most patients in this study had lateral sialoceles near the parotid incision thus avoiding injection near the facial nerve branches.

Aspiration alone resulted in reaccumulation of fluid in less than 1 week in 3 patients and a chronic salivary-cutaneous fistula in 1 patient. Botulinum toxin type A injections after aspiration prevented recurrence for up to 13 months, the longest follow-up time. Whether the results in this study are permanent is unknown. Recurrence rates associated with botulinum toxin type A injection in motor diseases is 3 to 4 months. It has been shown that after botulinum toxin type A injection the effected muscle is functionally denervated and atrophies. It requires roughly 3 to 4 months for new acetylcholine receptors to develop. New axons sprout to connect with these new receptors which re-form neuromuscular synapses.

Recurrence rates associated with botulinum toxin type A injection in patients with Frey syndrome are significantly different when treated for neuromuscular disorders than muscle, averaging 15 months vs 6 months, respectively. This delay in regeneration of sweat nerve endplates as compared with the motor endplates is not well understood. Whether this longer duration of effect...
observed with Frey syndrome will be similar for sialoceles is yet to be determined. One could speculate that removing the saliva by aspiration and decreasing salivary secretion back into the sialocele by botulinum toxin type A injection might result in obliteration of the surgical defect and resolution of the sialocele. Clearly, larger, randomized studies with longer follow-up periods are necessary to determine accurately the outcome of this modality for the treatment of sialoceles. Finally, studies evaluating botulinum toxin type A in the treatment of other salivary pathologic conditions such as ranulas is warranted based on the successful outcome of our study.

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REFERENCES