Phosphatidylcholine/deoxycholate lipolysis and hyaluronic acid augmentation to enhance nonsurgical lower facial contouring using botulinum toxin type A

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Summary

Botulinum toxin type A can produce dramatic improvements in patients with benign masseteric hypertrophy but this method alone is not as effective for patients with a rounded lower face. The paper describes the effective use of selective lower jowl phosphatidylcholine/deoxycholate lipolysis and chin, cheek, and nose augmentation with hyaluronic acid to refine cosmetic lower facial contouring using botulinum toxin type A in a young Asian woman. A series of treatments was administered over 26 months. The patient's lower cheeks were slimmed and jowl definition was improved producing the patient's desired sculptured, heart-shaped face. The injection-based procedures provided much preferable alternative to surgery from the perspective of both the patient and her family. The authors believe that this is the first case report in the published literature reporting these three methods used in conjunction.

Keywords: botulinum toxin, filler, hyaluronic acid, lipolysis, nonsurgical, phosphatidylcholine

Introduction

The use of botulinum toxin type A (BTX-A) to treat benign masseteric hypertrophy was first reported in 1994,[1] and satisfactory improvements have been reported in this patient group.[2,3] However, this method alone is not as effective for patients with a rounded lower face. We present a case of effective treatment with selective lower jowl phosphatidylcholine/deoxycholate (PCD) lipolysis and chin, cheek and nose augmentation using hyaluronic acid (HA) to refine cosmetic lower facial contouring using BTX-A. The authors believe that this is the first case report in the published literature reporting these three methods used in conjunction. The case report was first presented at the MASTER Conference of Network-Lipolysis in Paris, France, on September 15, 2007. We also provide an overview of treatment outcomes in a further 15 patients who have received this treatment combination.

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Report

A 20-year-old Asian woman presented with benign masseteric hypertrophy and a prominent rounded lower face. Her desire to change her ''baby face'' had extended to a request for masseteric resection and mandibular osteotomy from a plastic surgeon who referred her to our clinic. The treatment regimen was designed to avert the need for surgical treatment.

Combination treatment administered in 11 sessions over a 26-month period included BTX-A 252 U (Botox®; Allergan, Irvine, CA, USA), PCD 3155.5 mg (phosphatidylcholine 50 mg/mL with sodium deoxycholate 42 mg/mL, compounded by Australian Custom Pharmaceuticals, Taren Point, NSW, Australia), cross-linked HA injected into the chin (38.4 mg; Juvéderm® Ultra Plus; Corneal, Paris, France) and

Table 1 Treatment regimen

Time after initial treatment	Treatment
Initial treatment	BTX-A 72 U
9 weeks	BTX-A 60 U
10 weeks	PCD 750 mg
5 months	PCD 875 mg
5.5 months	BTX-A 60U
9 months	PCD 937.5 mg
13 months	BTX-A 60U
22.5 months	PCD 593 mg
25 months	Cheek enhancement with cross-linked HA gel 40 mg (2 mL of 20 mg/mL) and chin enhancement with cross-linked HA filler 19.2 mg (0.8 mL of 24 mg/mL)
25 months	Additional chin enhancement with cross-linked HA filler 19.2 mg (0.8 mL of 24 mg/mL)
26 months	Nose enhancement with stabilized HA 20 mg (1 mL of 20 mg/mL)

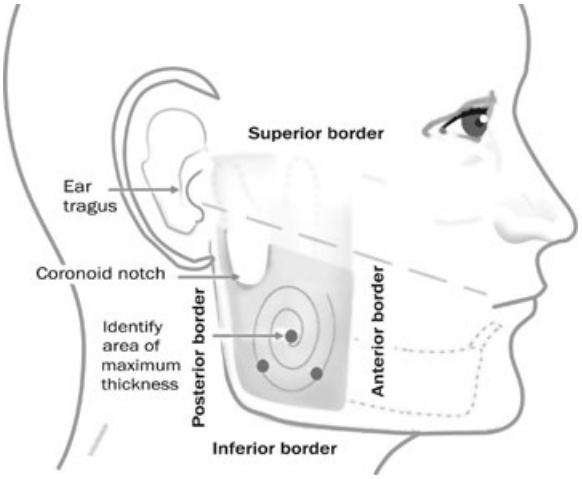

Figure 1 Injection points for high-dose botulinum toxin type A.

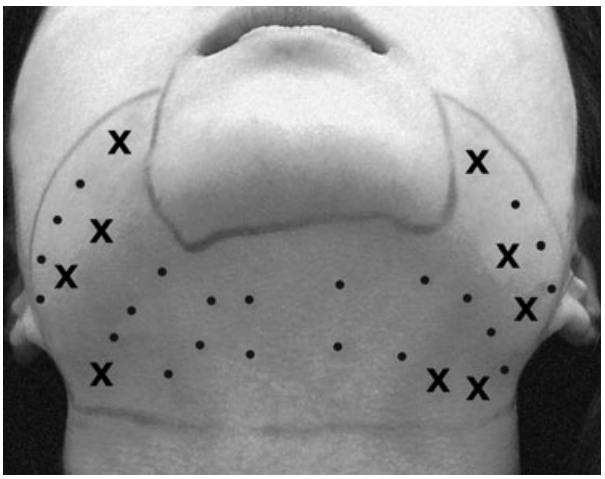

Figure 2 Example of injection points for phosphatidylcholine/deoxycholate (PCD) lipolysis: × = 0.25 mL PCD (12.5 mg), • = 0.5 mL PCD (25 mg).

cheeks (40 mg; Voluma Corneal®; Corneal), and stabilized HA (Restylane Perlane®; Q-Med AB, Uppsala, Sweden) 20 mg injected into the nose (Table 1).

In preparation for BTX-A treatment, the masseter muscle was delineated and marked out with the patient's jaw clenched, to identify anterior, posterior, superior and inferior borders and the site of maximum muscle projection. BTX-A 100 U was diluted in normal saline 1 mL and administered using a 30-gauge half-inch needle. Injections were placed at least 1.5 cm below a line drawn from the tragus to the oral commissure to avoid affecting the risorius muscle and, potentially, the patient's smile. Injection points were in a triangle, the lower two points 1 cm from the lower lateral edge of the inferior border of the masseter, and the upper point in the area of maximal masseter thickness (Fig. 1).

For lipolysis, the area was marked out (Fig. 2), and topical anesthetic (benzocaine 9%, lidocaine 9%, and tetracaine 9%, compounded by Optimus Healthcare, Auckland, New Zealand) was applied for 20 min. PCD was drawn up in a 3-mL syringe and injected using a 30-gauge half-inch needle 5 mm from the drawn boundary, 1.5 cm apart, in amounts of either 0.25 or 0.5 mL (Fig. 2).

Hyaluronic acid was injected using a 21-gauge 1.5-inch needle for the cheeks and a 27-gauge half-inch needle for the chin and nose.

The lower cheeks were slimmed, and jowl definition was improved producing the patient's desired sculptured, heart-shaped face (Fig. 3). Contouring has been maintained despite a significant weight gain of eight kilograms between treatment at two months and treatment at 21 months (weight increased from 45.5 to 53.5 kg; BMI increased from 17.6 to 20.6).

The combination treatment described very effectively achieved this patient's desired face shape, and the injection-based procedures were preferable to surgery from the perspective of both the patient and her family.

Practical application

The approach described provides a viable alternative for lower facial contouring where surgery is not desired.

Careful patient preparation is crucial to a successful outcome. Patients need to have realistic expectations, to

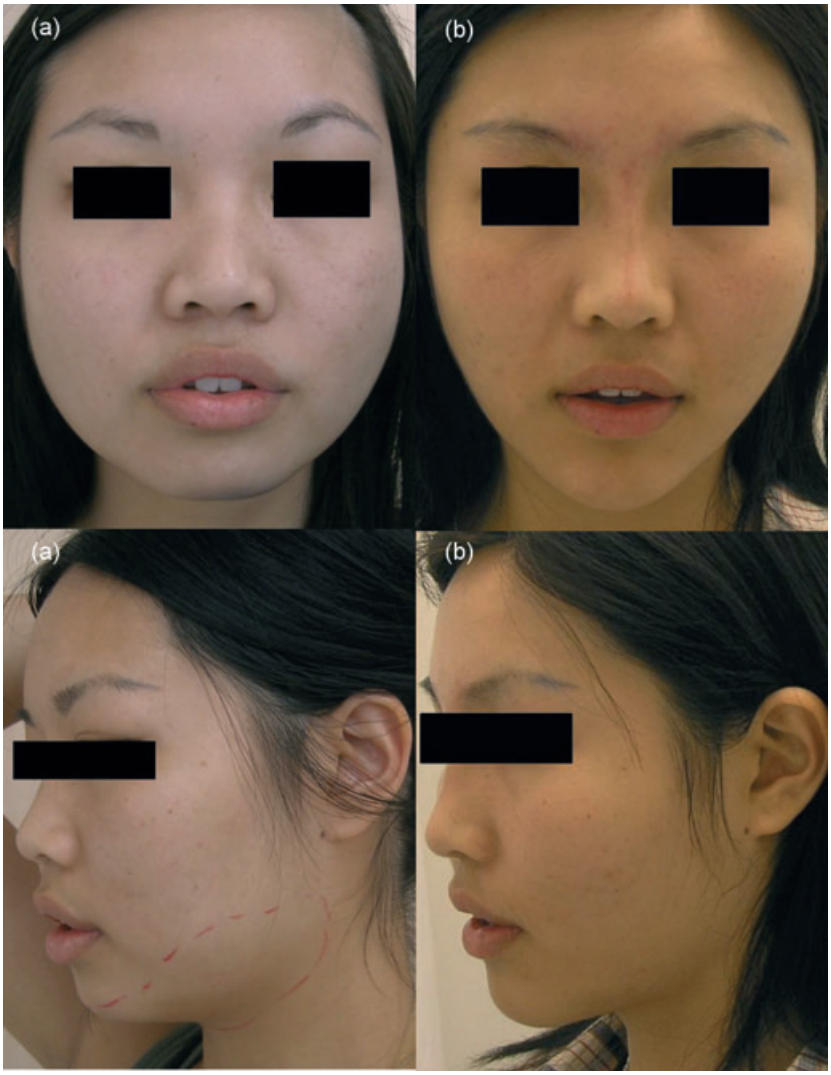

Figure 3 Photographic images depicting lower facial contouring using phosphatidylcholine/deoxycholate lipolysis and hyaluronic acid fillers to enhance botulinum toxin type A treatment. Before (a) and after (b) complete treatment regimen.

be willing to undergo multiple sessions, and to be aware that there will be a delay of several weeks before results are apparent.

We have used PCD lipolysis to effectively enhance nonsurgical lower facial shaping with BTX-A in 29 patients with plump faces or cheeks that lack jowl line definition, with or without benign masseteric hypertrophy. In this combination, BTX-A continues to play the major role in facial shaping. This is evidenced anecdotally in patients who have received only BTX-A to the masseter for facial shaping. However, BTX-A cannot produce a slimmer appearance in the lower face in patients with fat in the lower jowl region. This is achieved in these patients with PCD lipolysis.

HA for chin, cheek, and/or nose augmentation has been added in a further 16 patients including the representative case presented. Chin augmentation better defines a patient's jowl line. Cheek augmentation contours the lower face, creating a hollowing effect in the cheek, which highlights the higher cheek. In all cases, similar favorable treatment outcomes to those seen in the reported case have been achieved. With experience, the author has found that it is possible to readily predict final results and that similar outcomes can be achieved with fewer visits by combining the administration of BTX-A with the PCD treatment on the same day.

Complications of treatment within this treatment group have been limited to two of a total 308 BTX-A recipients in whom the superficial masseter muscle

bulged temporarily on mastication. This problem has since been resolved with the use of deep fiber injections as described below.

Single-session high-dose BTX-A, rather than the divided doses in the case described, has been used in subsequent cases. It achieves similar results while using a lower total BTX-A dose and results in fewer procedural sessions overall.

The following single-session BTX-A dosage and treatment recommendations are based on the author's wide experience using different dilutions of BTX-A (100 U in 4, 2.5, 2 or 1 mL), different injection site numbers (1 through 6), and total doses ranging 24–180 U:

- The dose of BTX-A is based on face shape and degree of masseter hypertrophy. Up to 180 U total is used for a strong, square face, resulting primarily from benign masseteric hypertrophy. In essentially normal masseters with a palpable bulge on contraction, 60–82 U total is used, depending on the desired reduction in masseter size.
- For large bulky masseters, 40% of the dose is used in the center injection point and 30% in each of the two lower points. For smaller masseters, one-third of the dose is used in each of the three injection points. Where there is asymmetry in the face, this is highlighted to the patient and higher doses are injected into the larger side.
- The BTX-A is administered deep into the masseter muscle to avoid temporary relaxation of the superficial masseter muscle. The latter causes a bulge in the masseter muscle during mastication that lasts for two weeks before the medial and deep masseter muscles become chemically denervated.
- A maintenance dose of BTX-A every nine months at one-third of the original dose is typically required to maintain face shape.

The PCD dose is determined based on the amount of fat and the desired contouring with injections of undiluted PCD 50 mg/mL. The author does not inject medially of the marionette line, to avoid blood vessels and nerves in that area, or in the chin. Ice packs are applied immediately for 20 min duration to reduce swelling and discomfort. Patients are reviewed on day 1 or 2, day 14, and circa day 60. Further lipolysis is administered at the latter visit if required for palpable and visible fat in the lower jowl.

Within the group of patients the author has treated, the most common side effect from high-dose BTX-A to the masseter is tiredness during mastication, which often does not last longer than two weeks. PCD produces significant swelling, erythema, and tenderness to the affected region in all patients, which lasts from four to 14 days. Bruising at the injection site is common. There have been no other side effects.

Our experience with adverse effects to BTX-A including an absence of significant adverse effects is directly in keeping with the published literature. Nontargeted muscle weakness or greater than anticipated weakness are possible complications.[4]

Local tenderness, swelling, and nodularity are expected with effective PCD treatment, and patients need to be prepared accordingly. A typical sequence of events posttreatment with PCD includes mild tenderness, burning, or itching in some patients on the day of treatment. Erythema from day 1 will resolve within 2–3 days. Moderate to significant edema will persist to day 2 or 3, although most swelling resolves after day 3. Some patients may experience bruising. Persistent tenderness and edema tend to resolve within a week of treatment although may continue in mild form along with superficial paresthesia that lasts for 1–2 weeks. Most adverse effects have resolved within 2–4 weeks of treatment although subcutaneous nodules may persist at the injection site and patients may need to be reassured that this ablated fat will disappear slowly.

Rotunda describes the following rare but more serious potential adverse effects of PCD: skin necrosis where solution is inadvertently injected superficially; a hyperpigmentation response to the vigorous inflammatory reaction in darker skin types; significant bruising, more typically where there is anticoagulant treatment; persistent nodularity beyond two months, which is more likely with multiple high-volume injections at the same site; and persistent numbness at the injection site or anesthesia of the skin over the treatment area.[5] In four years of PCD masseter treatment, the authors have not witnessed any of these serious adverse effects.

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