Combined transdermal scopolamine and botulinum toxin A to treat a parotid fistula after a face-lift in a patient with siliconomas

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Abstract. A parotid fistula is a rare, extremely unpleasant disease. Patients with chronic pathologies of the facial soft tissues have a high complication rate after aggressive treatments. Alternative conservative treatments have recently been reported for this condition. The case is described of a parotid fistula following a face-lift in a patient affected by facial siliconomas. A 41-year-old Caucasian who had undergone repeated facial silicone injections developed a diffuse granulomatous reaction accompanied by facial disfigurement. Thirteen surgical operations were performed to remove the siliconomas and correct the deformities, the last of which was a face-lift. After this procedure, the patient developed a parotid fistula. Conservative treatment, consisting of a combination of transdermal scopolamine and botulinum toxin A injections, was adopted. These antisylogogues gradually reduced saliva secretion, thereby preparing the wound bed for a skin graft and eventual healing. The choice of conservative therapy, as opposed to a surgical approach, was made to avoid further risks in what was already a highly complicated condition. The use of this conservative approach is recommended to treat complicated cases of parotid fistula.

Parotid fistula is a rare, devastating disease. It consists of a communication duct between the salivary gland or duct and the skin, through which saliva is discharged\(^1\). The most frequent aetiologies are accidental trauma or a postoperative complication after parotid gland surgery or rhytidectomy. Acute lacerations, if promptly diagnosed, can be surgically repaired by primary closure.

If diagnosis is delayed, other therapeutic measures are necessary. Surgical procedures include: the use of drains (graft tube in Gore-Tex\textsuperscript{TM}) and advanced dressing (Alloderm\textsuperscript{TM}); anastomosis of the
proximal stump of the parotid duct to the oral mucosa; the use of a saphenous vein graft to reconstruct the salivary duct; tympanic neurectomy; temporalis fascia pedicle flap to isolate the parotid fistula; partial or total parotidectomy¹.

Conservative treatments that have been described in the literature are local radiation and anticholinergic antisialogogues, such as scopolamine³,⁵. Antisialogogues can be administered orally or transcutaneously to reduce or completely block the salivary flow in approximately 7–10 days. Oral therapy has many side effects, including nausea, vomiting, photophobia, memory loss, mouth, nose, skin and throat dryness, along with other side effects commonly associated with anticholinergic drugs⁴. The transdermal therapeutic system consists of an adhesive patch; this patch contains a priming dose of scopolamine to initiate therapy and a reservoir of active drug to maintain therapy for a further 2–3 days⁶. The only major side effect of this type of treatment is mouth dryness.

An alternative, recently described, conservative treatment for scialorrea is botulinum toxin A (BTX-A) injection, which reduces fistula closure time. This treatment is minimally invasive, is associated with a low morbidity and is well tolerated by the patient²,¹². This toxin allows temporary chemical denervation by blocking neurotransmitter release at the cholinergic nerve-ending level. As the secretor fibres to the parotid gland are cholinergic parasympathetic, they are susceptible to BTX-A inhibition. This effect is fully reversible.

The case is reported of parotid fistula formation following a face-lift performed on a patient with facial siliconomas. A minimally invasive approach, consisting of a combination of transdermal scopolamine (TS), BTX-A injections and skin grafting, was adopted to solve this complication.

**Case report**

A 41-year-old Caucasian with trans-sexual gender identity problems performed repeated face injections of liquid silicone for aesthetic purposes in 1995. Three years later, a serious granulomatous inflammatory reaction disfigured her face, causing massive cheek asymmetry, bilateral eyelid ectropion and diffuse tumefaction. The patient subsequently underwent 12 surgical operations from April 1998 to September 2004, including multiple cortisone infiltrations, surgical removal of the siliconomas, three ultrasonic liposuctions, three lipofillings, and two bilateral transbone canthoplasties (the first with the Montandon technique⁹, the second with a micro mitek anchor⁸).

Over time, the condition was characterized by periods of relative quiescence followed by a recrudescence of the granulomatous inflammatory reaction. In June 2005, following the recurrence of bilateral eyelid ectropion, facial asymmetry and
residual siliconomas, the patient asked for a substantial improvement in facial appearance. A minimal access cranial suspension (MACS) face-lift was chosen to correct the relapsed ectropion, to remove the siliconomas and to reshape the facial contour. Surgery revealed numerous granulomas in a densely scarred avascular surgical bed in both cheek regions that complicated the dissection on the supra subcutaneous musculoaponeurotic system plane, but neither parotid gland was apparently violated. The early postoperative course was uneventful.

On the 13th post-surgical day, the patient developed a massive painless swelling and intensive hyperthermia in the left cheek. A clinical examination revealed a 3-mm orifice, on a pre-existing scar, that was discharging a clear serous fluid. This discharge increased during drink or food intake and caused progressive skin necrosis on the subsequent days (Fig. 1). Percutaneous aspiration showed that the fluid was serous in nature, salivary secretion being strongly suspected. A biochemical examination confirmed the presence of amylase.

The treatment options were assessed and explained to the patient, who agreed to conservative measures. TS treatment was thus initiated to stop the enzymatic lytic action of the saliva on the cheek skin. The TS patch was replaced every 48–72 h, and treatment was extended for 18 days. As TS had only partially reduced saliva secretion by the end of the treatment period and the open wound persisted, local injections of BTX-A were performed to increase the anticholinergic effect. We used Botox containing 100 U of BTX-A (Botox®, Allergan, Inc., Irvine, CA, USA). The toxin was diluted with 2.0 ml of sterile normal saline, yielding 5.0 U for each 0.1 ml. The uncovered parotid area was directly infiltrated with 20 superficial microinjections of 0.1 ml each using a 1-in., 30-gauge needle. A beneficial response was observed 4 days after injection. The combined use of both antisialogogic drugs led to complete cessation of the saliva secretion (Fig. 2). The patient initially complained of mouth dryness, although this gradually subsided over 6 months. No signs of facial mimetic muscle paralysis were observed.

Once the salivary leakage had been resolved, on 30th August 2005 the patient underwent a skin grafting from the left inguinal region to cover the residual defect. Postoperative healing of the skin graft was uneventful (Fig. 3). Six months later, there were no signs of salivary fistula recurrence. Magnetic resonance imaging confirmed the absence of the parotid fistula and revealed sclerosis and partial atrophy of the left parotid gland (Fig. 4).

**Discussion**

Salivary fistula is a rare, well known complication following trauma or facial sur-
surgery in the parotid region. Its symptoms become apparent in the form of chronic fistulation, often along surgical scars, with gustatory intensification of salivary exudation. The autolytic saliva components hinder wound healing and favour infections. Treatment of parotid fistulas is complex, troublesome and lengthy. Drains and advanced dressing, parotidectomy, tympanic neurectomy, pharmacotherapy with anticholinergic drugs and local radiation are therapeutic options, all of which entail considerable stress for the patient. Total parotidectomy, which is currently the surgical treatment of choice for this condition, is burdened by a high morbidity and increased risk of facial nerve injury. There are also reports of surgical techniques designed to prevent parotid fistulae in cases of partial resection of the parotid, and in particular the use of the subcutaneous musculoaponeurotic system to close defects invading the parotid gland.

Alternative conservative treatments, particularly scopolamine and BTX-A, have recently been reported. These treatments consist of anticholinergic drugs designed to block the cholinergic secretomotor fibres to the salivary gland, and thus stop saliva secretion and allow spontaneous closure of the fistula.

Scopolamine is a drug used to prevent and treat motion sickness that has a marked antisialogogue action. The transdermal patch application of this drug gradually releases the drug into the bloodstream, thereby yielding an enduring antisialogogue effect without any of the side effects of the oral therapy, such as constipation, blurred vision and bloated feelings.

BTX-A is an exotoxin of Clostridium botulinum, which has previously been used in many neuropathic motor disorders to block the release of acetylcholine in the neuromuscular synaptic membrane. The blockage of acetylcholine release also occurs at the cholinergic synapses of the autonomic nerve system in salivary and perspiratory glands. BTX-A has already successfully been used in the treatment of hyperhidrosis, Frey’s syndrome and sialorrhoea. The primary mechanism is receptor-mediated endocytosis of the toxin in the region of the synapses, with subsequent selective proteolysis of the vesicular protein; this prevents the release of acetylcholine into the cholinergic synaptic gap.

In this patient, a minimal access cranial suspension face-lift performed to correct the relapsed eptropion, remove the siliconomas and reshape the facial contour was complicated by parotid fistula formation and subsequent skin necrosis. The manifestation of a parotid fistula on the 13th postoperative day actually exacerbated a pre-existing condition caused by silicone fluid injection. The marked granulomatous inflammatory reaction and the massive mid-low face tissue sclerosis, resulting from the siliconomas, further complicated the surgical procedure.

Various treatment options were examined. A total parotidectomy was deemed unsuitable because of the high risk of facial nerve injury owing to the presence of the granulomatous inflammatory reaction and sclerosis around and inside the parotid gland. The use of regional flaps, such as a temporalis fascia pedicled flap, to isolate the parotid fistula would not have stopped the saliva leakage and may even have led to fistula recrudescence. A selective tympanic neurectomy might have been a reasonable surgical option, but it would have permanently terminated parotid gland function.

These various treatment options were explained to the patient, who agreed to initially conservative measures. Thus, pharmacological therapy was selected to reduce morbidity in an already complicated, high-risk condition. After TS treatment failed to fully stop the salivary fluid leakage, BTX-A was injected into the affected parotid area. A highly concentrated toxin solution was used to selectively block parotid secretory activity. Facial nerve damage, which may have been caused by needle injection, was avoided by using a fine needle (1-in., 30-gauge) that was inserted into the superficial exposed parotid gland. The fact that the intra-parotid injection was superficial and the BTX-A solution was highly concentrated helped prevent toxin diffusion to the surrounding mimetic muscles innervated by the facial nerve; if any muscle weakness had occurred, it would have been temporary.

The combined therapy effectively blocked saliva secretion by allowing granulation tissue formation on the wound bed first, then skin graft take and eventual healing. To the authors’ knowledge, this is the first report of the combined use of these drugs for such purposes.

In summary, this conservative strategy not only proved successful, but avoided use of an invasive approach and further risks for the patient. Given the absence of significant side effects, and the manageability and low degree of invasiveness of this therapy, the use of combined TS and BTX-A is advocated, in conjunction if necessary with wound coverage techniques (e.g. skin grafting) to accelerate healing, for the treatment of parotid fistulae, particularly in patients affected by soft-tissue chronic pathologies, such as granulomatous inflammatory reactions to silicon.

References