Botulinum toxin type A (BTX) injections are well established for the treatment of a wide spectrum of diseases. Hypersalivation or drooling of various origins can be effectively and safely treated by injections of BTX into the main salivary glands. This procedure reduces salivary flow because of its ability to inhibit the

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release of the neurotransmitter acetylcholine in the cholinergic parasympathetic nerves in the glands.

To date, the experiences in the treatment of gland swelling by BTX injections are limited to a small number of publications and there appears to be a lack of case reports on this subject. Ellies et al described the treatment with BTX for 2 patients with sialadenitis due to different causes. One publication suggested the theoretical possibility of BTX as a treatment for chronic sialadenitis resulting from salivary duct stenosis. Recently, Capaccio et al described the successful use of BTX associated with salivary gland disorders of different etiologies, with 2 of the patients with recurrent parotitis due to duct strictures.

Here, we report on the successful treatment of chronic parotitis in a male patient with Stensen’s duct stenosis by the local application of BTX into the parotid gland tissue.

CASE REPORT

We report on a 58-year-old man who had had chronic parotitis for more than 12 years, due to multiple strictures in Stensen’s duct of the left parotid gland (see Figure 1). Invariably during meals, he developed recurrent painful parotid swelling (see Figure 2). The patient’s attempts to treat parotid swelling by massaging the affected gland were generally ineffective. The patient reported his experience with previous treatments, such as Stensen’s duct dilation. After the third sialography, the decision was made not to carry out further duct dilations because of multiple stenoses in Stensen’s duct. Furthermore, percutaneous radiotherapy was carried out with a total dosage of 7.5 Gy. Nevertheless, all therapeutic approaches remained ineffective, and the patient was admitted to the Department of Otorhinolaryngology at the University of Goettingen for evaluation prior to considering parotidectomy.

A detailed examination and a medical history interview revealed no further disorders of the affected gland, especially no sialolithiasis. No oral irritations or inflammation were found. Moreover, no paralysis of the facial nerve of the affected parotid gland was revealed in the physical examination. The patient had no history of allergies, alcohol abuse, or nicotine consumption. The patient reported a thyroidectomy in 2003 and radiiod therapy in 2004 to treat a C cell carcinoma of the thyroid gland. He further reported a deterioration of the painful parotid
swelling after radioiod therapy. The patient received thyroxine and calcium tablets as regular medication.

After information about effects and side effects of parotidectomy as well as BTX injections, the patient expressed a wish to try BTX therapy before making a decision for surgical intervention.

After the patient gave his written informed consent, the first treatment was performed with $3 \times 7.5$ units BTX ($7.5$ units = $0.3$ mL Botox, Allergan, Irvine, CA) injected into the parotid gland under sonographic control (see Figure 3). Three further treatments followed with the dosage increased to $3 \times 10$ units BTX ($10$ units = $0.4$ mL Botox). Before and after BTX injection, the patient was asked to score the severity of his parotid swelling symptoms on a 4-point scale ($0$ = no, $1$ = mild, $2$ = moderate, $3$ = moderate to severe, $4$ = severe). The patient was also asked to record the frequency of required and effective massage of the gland to prevent parotid swelling, as well as possible side effects of BTX injection, such as xerostomia, oral infections, sialolithiasis, impairment of mimic gestures, suprahyoid muscles, and/or muscles of mastication.

A summary of the patient’s scoring is given in Figure 4. Before BTX injection, the patient assigned a score of $4$ to the painful parotid swelling. After the first treatment, the patient reported a significant decrease in recurrent parotid swelling after 1 week (score: $1$) of injections, then he gave a score of $0$ during the following 5 weeks. There were no side effects. Examination of the patient revealed no oral infections or sialolithiasis of the affected gland, and facial nerve examination revealed no paralysis. After 6 weeks, the patient reported a recurrence of parotid swelling (score: $3$). Therefore, a second treatment with an increased dosage of BTX followed, and the patient experienced improvement again after the first week. The patient scored the severity of his symptoms as $0$ for the following 4 months. After the third treatment, the symptoms improved again for 4 months (score: $0$). A fourth injection was recently made when the swelling recurred (score: $3$), and the patient again experienced complete disappearance of parotid swelling after 2 weeks (score: $0$). At the time of this writing, none of the BTX injections has resulted in any side effects, and physical examination of the patient has not revealed any abnormality.

Before BTX treatment, the patient reported that massaging of the parotid gland, to prevent parotid swelling, was generally ineffective. Under BTX treatment, the frequency of required massages was half that previously reported by the patient. A feeling of slight pressure in the gland and an associated subjective feeling of initiation of parotid swelling during meals was still experienced by the patient. However, he was able to effectively treat this problem with gentle massaging of the gland.

**DISCUSSION**

The patient referred had experienced recurrent parotid swelling because of Stensen's duct stenosis for more than 12 years, with this symptom always occurring during meals. During this
time, diagnostic sialography was performed 3 times to evaluate the disease progress. A continuous increase in the severity of duct strictures was found possibly due to multiple inflammations and swellings of the parotid gland in the last years. However, in 2004 the patient also underwent a radioiod therapy to treat a C cell carcinoma of the thyroid gland. It is well known that this treatment can result in duct strictures,\(^{11,12}\) and an increase in symptoms as was the case in this patient. Therefore, radioiod treatment could also be responsible for the decline of the patient’s symptoms and the sialographic results.

Traditional treatment options for parotid duct strictures include conservative methods, like antibiotics, analgesics, or self-massage of the gland.\(^{6,13}\) As second-line therapy, minimally invasive procedures such as sialendoscopic dilation of the duct, as well as invasive sialoadenectomy, are considered.\(^{1,4,5}\) Sialendoscopic dilation plays a major role in today’s gland-preserving treatment of Stensen’s duct stenosis, with an overall success rate of 80%.\(^{14,15}\) In only 4% to 5% of all cases this treatment option failed and parotidectomy should be considered as a therapy of last choice.\(^{14,15}\) Our patient also reported his experience with therapeutic approaches such as duct dilations. However, in this case, neither attempts at duct dilation nor percutaneous radiotherapy provided a cure for the patient’s disorder. The patient’s quality of life was markedly adversely affected and parotidectomy was considered.

In agreement with Capaccio et al\(^{11,10}\) and from our experience in the successful treatment of salivary gland disorders with BTX,\(^{8,9}\) we recommended to him the possible management of recurrent parotid swelling by regulating and reducing salivary flow in the affected parotid gland using BTX injections.

BTX is well established in the treatment of hypersalivation or drooling, resulting from diverse origins (eg, chronic parotitis).\(^9\) The first dosage of 22.5 units Botox was proposed for the patient, as this has been shown to be an effective dose in the treatment of patients with salivary disorders.\(^9,16\) Typical of the BTX effect, as is apparent in other studies, was the reduction in symptoms after 1 week of injection,\(^8,9,16\) as reflected in the scores given by the patient himself. The full effect was achieved after 2 weeks, and during that period the patient reported the disappearance of recurrent parotid swelling. In general, it has been shown that the effect of BTX lasts approximately about 3 months when injected into salivary glands. However, the duration of the BTX effect varies widely between patients.\(^9,16\) Our patient reported recurrence of symptoms already after 6 weeks. Therefore, a second injection was carried out with an increased dosage of 30 units Botox, to obtain a possible longer-lasting effect, without causing side effects. This proved to be the optimal dose, as the patient experienced an improvement in symptoms for more than 4 months. This longer-lasting effect was also maintained after the third treatment. Moreover, he did not have complaints of possible side effects.

A common conservative method of treating gland swelling in such cases is the use of massages of the affected gland, which can be performed independently by the patient.\(^6,17\) Before BTX treatment, the patient reported that massaging the affected parotid gland was necessary before every meal-time, to prevent gland swelling. But massage basically remained ineffective. During the period of time when BTX was effective, the patient still had a feeling of slight pressure in the gland during meals. The patient said that he always massaged the gland when there was the slightest hint of expected parotid swelling. Therefore, it remains unclear whether massage has an additional effect superimposed on the objectively measured reduction in gland swelling with BTX treatment.

Overall, the patient reported a substantial improvement in his quality of life and expressed a wish to continue the BTX treatment, and therefore delay in the need for a parotidectomy.

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**REFERENCES**