



Ultrasound-guided Botulinum Toxin Injection into the Salivary Glands for Treating Sialorrhea in a Case of Small-cell Lung Cancer

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What is known on this subject?

In cases resistant to medical treatment, botulinum toxin application with ultrasound guidance to the salivary glands appears to be an effective and safe method.

What this study adds?

Since this method is known for increased saliva, more studies are needed for this subject. Our case will add expert experience to the literature.

ABSTRACT

Sialorrhea or excessive drooling is an important problem known as saliva spillage from the mouth. Drooling may accompany many diseases, especially chronic neurological diseases and other chronic diseases. A 57-year-old female patient presented with a complaint of drooling that started after concurrent chemotherapy and radiotherapy due to small-cell lung cancer. The patient's complaints were significantly reduced with an ultrasound-guided botulinum toxin injection into the salivary glands.

Keywords: Sialorrhea, botulinum toxin, treatment, lung cancer

Introduction

Sialorrhea is a clinical condition that occurs when saliva cannot be swallowed because of an increase in saliva secretion or a dysfunction in the coordination of the oral phase of the swallowing mechanism. Mental retardation and cerebral palsy in children, Parkinson's disease (PD), amyotrophic lateral sclerosis (ALS), and stroke in adults are the most common causes. Rare causes include oral inflammation (tooth, gum), drug adverse effects (clozapine, risperidone), gastroesophageal reflux, toxin exposure (mercury), and oral anatomical disorders (macroglossie). There are different treatment options ranging from conservative methods

such as regulating eating habits, exercise, and intraoral devices to invasive methods such as botulinum toxin (BTX) application, radiotherapy (RT), and surgery (1).

Here we present a patient who was recently diagnosed with small cell lung cancer and underwent chemotherapy (CT), RT, and later developed sialorrhea that impaired the quality of daily life. The patient's complaints were significantly reduced with BTX, which we applied under ultrasound guidance as a treatment.

Case Report

A 57-year-old female patient presented with a complaint of increased saliva secretion. During the annual control of the patient



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who had tuberculosis 22 years ago, a mass was detected in the right bronchus and lung after the examination and tests performed in January 2020 with the complaint of influenza infection. After biopsy, she was diagnosed with small cell carcinoma. The patient gave a complete response to therapy after concurrent CT and RT (cisplatin + TNL 28 frc, 64.4 Gy). Then intensity modulated RT + image guided RT + volumetric modulated arc RT and linear accelerator technology were planned for the treatment.

Her habits are smoking (50 years*1 pack/day) and alcohol consumption socially.

She had a history of meningitis, breast fibroadenoma, operated myoma, and helicobacter pylori treatment. Currently, follow-up and treatments are performed by the gastroenterology clinic due to the problem of gastroesophageal reflux.

In the control fluorodeoxyglucose positron emission tomography (PET) examination, it was reported that the right hilar/paratracheal cardinal hypermetabolic mass and lymphadenopathy were not observed compared with pre-treatment PET. A grade II esophageal reaction was determined according to the Radiation Therapy Oncology Group acute radiation morbidity criteria. Electromyography was evaluated as normal.

When medical treatments (such as amitriptyline, propranolol, tropicamide) did not benefit, it was planned to administer 100 U of botulinum toxin type A (Botox® 100 U) under ultrasound guidance. Botox® 100 U was diluted with 2 cc of saline solution. Anesthesia was not used, and the area to be treated was cleaned locally. Under ultrasound guidance with a dental needle, BTX was performed on both parotid (35 U + 35 U) and submandibular glands (15 U + 15 U). There were no complications after the application. It was observed that there was a significant difference between the global impression of change scale (GICS) score before the application and the GICS score one week after the application (before: -3, after: +2).

Discussion

Although thoracic RT for lung cancer is generally well tolerated, acute esophagitis is the most prominent symptom during this treatment period. The RT technique and the radiation dose exposed by the esophagus are important factors in the incidence of esophageal toxicity. When 1/3 of the esophagus takes 60 Gy, the risk of complications in 5 years is 5%. The relationship with sialorrhea has been reported in conditions such as gastroesophageal reflux, esophagitis, and

loss of motility (2,3). In this study, diagnosed with small cell lung cancer, 64.4-Gy RT were applied and then a grade II esophageal reaction was detected.

BTX application to salivary glands is a treatment option used for treating sialorrhea in PD, ALS, pseudobulbar, and bulbar palsy. In a placebo-controlled, randomized, double-blind study, they concluded that BTX application provides level I evidence for treating chronic sialorrhea. In this study, 184 patients (three groups; placebo-75 U-100 U BTX) were included. While the injection was performed in 104 (56.5%) of the patients with ultrasound guidance, the rest was done using anatomical landmarks. Most patients had PD (70.7%), and the remainder had stroke and traumatic brain injury. Dry mouth (5.4% and 2.7% of patients) and dysphagia (2.7% and 0% of patients) were seen as side effects in the 75 U and 100 U groups depending on the application (4). We applied 100 U in this study with ultrasound-guided BTX injection. In this study, the GICS score was +2 at the end of the first week and no adverse effects were identified. In another study, most of the cases were PD and ALS, and an ultrasound-guided BTX injection was applied to the parotid and submandibular glands to reduce saliva secretion. 100 U of BTX was used for each patient and diluted with 4 mL of normal saline. A local hematoma in the left submandibular area, which was the application site, was observed in one patient, and a non-severe dysphagia was observed in another patient. All patients started to feel the effects of the treatment one week after the application, and the activity lasted for an average of 4.5 months (3 months-9 months) (5). Because of the study, BTX applied to pathothyroid and submandibular glands under ultrasound guidance was found to be safe and effective. In this study, we diluted 100 U of BTX with 2 mL of normal saline. We used a dental needle and applied it to several different points in the gland. There were no local complications after the application. The effect started a week after the application.

RT and surgical procedures that can be applied to the parotid and submandibular glands should be the last choices to be considered in order to reduce salivary secretion (6).

As a result; increased salivary secretion may accompany chronic diseases, especially chronic neurological diseases. In cases resistant to medical treatment, BTX application with ultrasound guidance to the salivary glands appears to be an effective and safe method. Comparative studies are needed on this subject.

Ethics

Informed Consent: Informed consent was obtained from the patient.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: M.Ç., A.A., İ.N.M., Concept: M.Ç., A.A., İ.N.M., Design: M.Ç., A.A., İ.N.M., Data Collection or

Processing: M.Ç., A.A., İ.N.M., Analysis or Interpretation: M.Ç., A.A., İ.N.M., Literature Search: M.Ç., A.A., İ.N.M., Writing: M.Ç., A.A., İ.N.M.

REFERENCES

1. Hockstein NG, Samadi DS, Gendron K, Handler SD. Sialorrhea: a management challenge. *Am Fam Physician* 2004;69:2628-2634.
2. Bentzen SM, Constine LS, Deasy JO, et al. Quantitative analyses of normal tissue effects in the clinic (QUANTEC): an introduction to the scientific issues. *Int J Radiat Oncol Biol Phys* 2010;76:S3-S9.
3. Werner-Wasik M, Paulus R, Curran WJ Jr, Byhardt R. Acute esophagitis and late lung toxicity in concurrent chemoradiotherapy trials in patients with locally advanced non-small-cell lung cancer: analysis of the radiation therapy oncology group (RTOG) database. *Clin Lung Cancer* 2011;12:245-251.
4. Jost WH, Friedman A, Michel O, et al. SIAXI: Placebo-controlled, randomized, double-blind study of incobotulinumtoxinA for sialorrhea. *Neurology*. 2019;92:e1982-e1991.
5. Abboud WA, Nadel S, Hassin-Baer S, Arad A, Dobriyan A, Yahalom R. Ultrasound-guided botulinum toxin injections into the salivary glands for the treatment of drooling. *Isr Med Assoc J* 2019;21:116-119.
6. Garuti G, Rao F, Ribuffo V, Sansone VA. Sialorrhea in patients with ALS: current treatment options. *Degener Neurol Neuromuscul Dis* 2019;9:19-26.