Drooling in Neurologically Impaired Patients: Treatment with Botulinum Toxin A

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Abstract
Drooling is common amongst neurologically disabled patients. It affects their social integration, and often creates a burden for the patients and their family. Botulinum toxin injection (Botox®) into the salivary glands chemo-denervates the neuroglandular junction and reduces salivary flow.

This retrospective study evaluates the effectiveness and safety of Botox injection into the salivary glands for the treatment of drooling.

More than 327 Botox® injections were performed between April 2004 and December 2006. 68% of patients were younger than 15 years old. The number of glands injected was three in 35.38%, two in 27.68% and four in 22.3%. Total doses ranged from 10 to 300 units of Botox®. Using objective rating scales for drooling frequency and severity, 50% of patients have improved but when the patient or caregiver’s overall perception is the outcome, the improvement rate increases to 78% of patients with 56% finding a major improvement in the drooling. One case of submandibular swelling that resolved in less than 24 hours was the only complication.

Conclusions: Botox® is an effective, reversible, and highly individualized response is observed. Therefore the benefit and the low rate of complications make it a valuable alternative before a more invasive option is considered. Well-controlled trials are needed to determine specific therapeutic criteria. Meanwhile, clinical judgment and individualized analysis of each patient’s case is recommended.

Background
Drooling is common amongst neurologically disabled patients. It causes a tremendous burden for patients and their family. It can also lead to serious consequences such as:

- Skin infections.
- Choking and/or aspiration.
- Feeding and/or speech problems.
- Withdrawal from peer activities.
- Social isolation.
- Interference with daily care and rehabilitation therapy.

To date there is no gold standard of treatment. Several options are available:

- Oral: anticholinergic medications, mouthwashes, suction, strictly scheduled breakfasts and meals, pacifiers, etc.
- Invasive: surgery, risk of aspiration, relationship between drooling and feeding time amongst others.
- Non-invasive: training with an experienced person decreases the drooling.

Botulinum toxin injection into the salivary glands chemo-denervates the neuroglandular junction throughout the duration of the botulinum release at the presynaptic terminal and reduces salivary flow.

Objective
To evaluate the effectiveness and safety of botulinum toxin A injections into the salivary glands in neurologically impaired patients with drooling.

Methods
This retrospective multicentric study included patients referred to the senior author (SD) at five different saliva management clinics in Montreal, Canada: a pediatric rehabilitation center (Macdonald Rehabilitation Center), a tertiary care pediatric hospital (Montreal Children’s Hospital), two tertiary care adult hospital (Montreal General Hospital, Montreal Neurological Hospital) and a private clinic (Queen Elizabeth Health Complex).

- Review of charts of all patients evaluated between April 2004 and December 2006.
- Identification of patients that received botulinum toxin A (Botox®, Allergan Inc., Canada) injections into the major salivary glands.
- Data collection: medical diagnosis, age, gender, dose received, injected glands, guidance technique, response, complications and duration of therapeutic effect.

Results
Our findings are compatible with the three double blind randomized controlled trials that have compared botulinum toxin A against placebo for the treatment of drooling in patients with neurological disease [1-3].

In our experience the response seems to be very individualized. We have found that the rating scales for drooling severity and frequency do not always correlate with the patients and their families. When the patient or caregiver’s perception of the response to each session is considered, 72.36% found themselves improved and no one experienced any worsening. The patient satisfaction increased to 78% after repeated injections, with 56% reporting a major improvement in drooling (Figure 5).

Conclusions
- Botulinum toxin A injection into the salivary glands is an effective and minimally invasive therapeutic tool for drooling.
- Highly individualized response is observed. Therefore, the treatment shall be adjusted according to the initial response achieved by each patient.
- The potential benefits in a high number of respondents make Botox® a valuable alternative for treating drooling patients before a more invasive or permanent option is considered.

- Well-controlled trials are required to determine specific therapeutic criteria. Meanwhile, we highly recommend clinical judgment and individualized analysis of each case prior to performing the injection.

- Training with an experienced person decreases the likelihood of complications.

References