

## Ultrasound-guided botulinum toxin A (BOTOX®) injection of salivary glands

1. General Considerations
  - a. Indications
    - i. Chronic sialorrhea in children and adults<sup>1</sup> (such as in cerebral palsy, developmental delay, stroke)
    - ii. Recurrent aspiration pneumonia<sup>2</sup>
  - b. Contraindications<sup>3</sup>
    - i. Allergy
    - ii. Neuromuscular disorders with acetylcholine dysfunction such as myasthenia gravis (AChR), Eaton-Lambert syndrome (presynaptic Ca<sup>2+</sup> channels)
    - iii. Relative contraindications include patients taking aminoglycosides or medications that involve neuromuscular transmission.
  - c. Advantages
    - i. Avoidance of systemic side effects (over anticholinergic medications)
    - ii. Avoidance of discomfort (over surgery)<sup>4,5,6</sup>
  - d. Pertinent Anatomy<sup>7</sup>
    - i. Submandibular gland: anteroinferior to mandibular ramus, in the region of the submandibular triangle, between the anterior and posterior bellies of the digastric muscle and around the posterior border of the mylohyoid muscle.
    - ii. Parotid gland: inject deep to parotidomasseteric fascia. Two injection points inferior to zygomatic arch and anterior to tragus. Third injection point in parotid tail.
2. Preoperative Preparations
  - a. Evaluation:

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<sup>1</sup> Alvarenga, A., Campos, M., Dias, M., Melão, L., & Estevão-Costa, J. (2017). BOTOX-A injection of salivary glands for drooling. *Journal of pediatric surgery*, 52(8), 1283-6. doi:10.1016/j.jpedsurg.2016.09.074

<sup>2</sup> Raval, T. H., & Elliott, C. A. (2008). Botulinum Toxin Injection to the Salivary Glands for the Treatment of Sialorrhea with Chronic Aspiration. *Annals of Otolaryngology, Rhinology & Laryngology*, 117(2), 118–122. <https://doi.org/10.1177/000348940811700209>

<sup>3</sup> Daniel, S. (2015). Botulinum toxin injection techniques for pediatric sialorrhea. *Operative Techniques in Otolaryngology-Head and Neck Surgery*, 26(1), 42-49.

<sup>4</sup> Lakraj AA, Moghimi N, Jabbari B. Sialorrhea: anatomy, pathophysiology and treatment with emphasis on the role of botulinum toxins. *Toxins (Basel)* 2013;5(5):1010–1031.

<sup>5</sup> Reed J, Mans CK, Brietzke SE. Surgical management of drooling: a meta-analysis. *Arch Otolaryngol Head Neck Surg*. 2009;135(9):924–931.

<sup>6</sup> Squires N, Wills A, Rowson J. The management of drooling in adults with neurological conditions. *Curr Opin Otolaryngol Head Neck Surg*. 2012;20(3):171–176.

<sup>7</sup> Standring S, Gray H. *Gray's anatomy: The anatomical basis of clinical practice*. 41st ed. Edinburgh: Churchill Livingstone/Elsevier; 2016. p. 504, 528.

- i. History: severity and duration of sialorrhea, impact of sialorrhea on quality of life for patient (and caregiver), history of aspiration pneumonia, frequent respiratory illnesses
    - ii. Response to prior treatment such as anticholinergic medication or previous injection
    - iii. Contraindications to sedation or anesthesia
  - b. Consent for surgery
    - i. Potential complications:
      - 1. Major
        - a. Severe dysphagia
        - b. Loss of motor control of the head
        - c. Paralysis of adjacent musculature
        - d. Allergic reaction (rare)
      - 2. Minor
        - a. Pain at injection sites
        - b. Hematoma
        - c. Bleeding
        - d. Minor to moderate dysphagia
        - e. Modification of saliva thickness with consequent dry mouth and viscous saliva
        - f. Masseter discomfort/rigidity
- 3. Nursing Considerations
  - a. Instrumentation and Equipment
    - i. Ultrasound with linear transducer (5-10 MHz)
  - b. Prep
    - i. Place patient supine and possibly with the neck extended (neurological condition might not allow complete neck extension)
- 4. Anesthesia Considerations
  - a. Sedation or general anesthesia
- 5. Operative Procedure<sup>8</sup>
  - a. Preparation
    - i. Disinfect the skin in the area over the parotid and the submandibular glands with an antiseptic (alcohol wipe).
    - ii. US-guided identification of glands and their surrounding tissues allows for a reduction in adverse events and a more accurate injection<sup>9</sup>
    - iii. Physician's decision between submandibular gland injection only or submandibular and parotid gland injection
  - b. Dosage<sup>10, 11</sup>

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<sup>8</sup> Benninger MS, Knott PD. Techniques of Botulinum Toxin Injections in the Head and Neck. Ch. 9: Salivary Gland Injections. Plural Publishing, 2012.

<sup>9</sup> Walter U, Dressler D. Ultrasound-guided botulinum toxin injections in neurology: technique, indications and future perspectives. Expert Rev Neurother. 2014;14(8):923–936.

<sup>10</sup> Porta, M., Gamba, M., Bertacchi, G., & Vaj, P. (2001). Treatment of sialorrhoea with ultrasound guided botulinum toxin type A injection in patients with neurological disorders.

- i. OnabotulinumtoxinA is currently the most commonly used agent
  - ii. Dilute 100U vial with bacteriostatic sterile 0.9% saline.
  - iii. No consensus regarding the site of injection of the toxin (single or multiple points), toxin dose or follow-up period.<sup>12</sup> Common dose is 5 units / kg divided among injected glands.
  - iv. Divide into syringes (1 per gland) with 25 or 27G needle. Will require 1.5” length needle for SMG injections. Placement of the injection well within the glandular tissue reduces the risk of extravasation outside the capsule.
- 2. Submandibular gland
  - a. Place the transducer under the mandible, between the anterior and posterior bellies of the digastric muscle, to visualize the submandibular gland.
  - b. Identify the widest gland diameter for lateral needle access.
  - c. Inject BTX-A into the upper and lower submandibular quadrants.
  - d. Direct pressure for hemostasis
- 3. Parotid gland (if performing)
  - a. If using ultrasound: place the transducer below the external acoustic meatus to visualize the parotid gland, which appears as a hypoechoic area with homogeneous echotexture compared to the surrounding tissues.
  - b. Inject BTX-A into the three sites. Will feel needle “pop” through gland capsule
  - c. Direct pressure for hemostasis
- 6. Postoperative Care
  - a. Consider nonsteroidal anti-inflammatory drugs (NSAIDs) for postoperative discomfort
  - b. Follow up in 1-2 months
  - c. Consider repeat injection or surgical management depending on clinical response
- 7. Suggested Readings/Additional Information
  - a. Barbero P, Busso M, Artusi CA, et al. Ultrasound-guided Botulinum Toxin-A Injections: A Method of Treating Sialorrhea. *J Vis Exp.* 2016;(117):54606. Published 2016 Nov 9. doi:10.3791/54606
  - b. CPT Code: No specific code exists. Discuss with your billing department.
    - i. Consider CPT 64611 (Chemodenervation of salivary glands), 42699 (Other Procedures on the Salivary Gland and Ducts),
  - c. HCPCS Code:
    - i. J0585 – Injection, onabotulinumtoxinA, 1 unit; 1 billable unit = 1 unit
    - ii. J0484 – medication use
    - iii. 64611 – Chemodenervation of parotid / submandibular glands, bilateral

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*Journal of neurology, neurosurgery, and psychiatry*, 70(4), 538–540.

<https://doi.org/10.1136/jnnp.70.4.538>

<sup>11</sup> <https://www.starship.org.nz/guidelines/botox-a-for-use-in-sialorrhoea-drooling/>

<sup>12</sup> Ruiz-Roca, J. A., Pons-Fuster, E., & Lopez-Jornet, P. (2019). Effectiveness of the Botulinum Toxin for Treating Sialorrhea in Patients with Parkinson's Disease: A Systematic Review. *Journal of clinical medicine*, 8(3), 317. <https://doi.org/10.3390/jcm8030317>