



Botulinum Toxin-A Injection Reduces Hospitalization Length in Post-Laryngectomy Pharyngocutaneous Fistulas



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INTRODUCTION

- Pharyngocutaneous fistula (PCF) after Total Laryngectomy (TL) occurs in as many as 15-20% of previously non-irradiated patients.
- Most wounds (60-80%) close with non-surgical wound management such as packing or vacuum assisted therapy.
- Injection of Botulinum Toxin A (BoNT-A) into major salivary glands has been proposed as a low-risk tool to promote fistula closure by reducing saliva production.
- Among healthy patients, BoNT-A can reduce saliva production by 80% for up to 4 months.
- Data on its efficacy for PCF closure is lacking, with *only 25 reported cases*.

METHODS

- Purpose: Preliminary Investigation into effect of BoNT-A injection for closure of PCF after TL, including closure rate and length of hospitalization (LoH).
- Retrospective review of patients with T3/4 laryngeal squamous cell carcinoma undergoing TL and neck dissections without prior chemotherapy or radiation
- BoNT-A was injected into bilateral submandibular glands within 3 days of developing PCF. Additional management included opening neck incision with packing changes

Outcome:

Description:

Fistula Closure Rate % of patients with closure of fistula after BoNT-A injection

Length of Hospitalization Length of time from admission to discharge (matched to historical controls)

Two sample t-test was used for all statistical significance tests, with significance $p < 0.05$

RESULTS

- Six patients injected (n = 6)
- Six out of six patients (100%) achieved PCF closure; no surgical management required
- Average time to PCF closure was 29.7 days. LoH was 12.1 days.
- Two-year stage-matched historical controls had PCF closure rates of 84% when managed non-surgically, with a 16.3 day LoH.
- Outcome differences were not statistically significant ($p > 0.05$) due to sample size

| Category | BoNT-A group | Historical Control |
|----------------------------------|--------------|--------------------|
| Number of Patients (n) | 6 | 134 |
| PCF Closure Rate (%) | 100% | 84% |
| Length of Hospitalization (days) | 12.7 | 16.3 |
| Average closure time (days) | 29.7 | 40 (n = 30) |

Table 1: Comparison of Fistula Closure Rate and Length of Hospitalization Among BoNT-A and Historical Control

DISCUSSION

- BoNT-A injection for patients with PCF after TL reduces LOH and improves non-surgical PCF closure rate in this small sample.
- Limitations of this study include small sample size and difficulty in determining average fistula closure time for historical control due to retrospective nature

CONCLUSION

BoNT-A injection may provide a low-risk tool to aid PCF closure. A prospective study is underway to further evaluate the efficacy of BoNT-A in PCF management.

REFERENCES:

1. Watson NA, Siddiqui Z, Miller BJ, Karagama Y, Gibbins N. Non-aesthetic uses of botulinum toxin in the head and neck. *Eur Arch Otorhinolaryngol*. Nov 2021;278(11):4147-4154. doi:10.1007/s00405-021-06750-4
2. McLean JN, Nicholas C, Duggal P, et al. Surgical management of pharyngocutaneous fistula after total laryngectomy. *Ann Plast Surg*. May 2012;68(5):442-5. doi:10.1097/SAP.0b013e318225832a
3. Fitzgerald CWR, Davies JC, de Almeida JR, et al. Factors predicting pharyngocutaneous fistula in patients after salvage laryngectomy for laryngeal malignancy - A multicenter collaborative cohort study. *Oral Oncol*. Nov 2022;134:106089. doi:10.1016/j.oraloncology.2022.106089
4. Mattioli F, Bettini M, Molteni G, et al. Analysis of risk factors for pharyngocutaneous fistula after total laryngectomy with particular focus on nutritional status. *Acta Otorhinolaryngol Ital*. Oct 2015;35(4):243-8.
5. Petracca M, Guidubaldi A, Ricciardi L, et al. Botulinum Toxin A and B in sialorrhea: Long-term data and literature overview. *Toxicon*. Dec 1 2015;107(Pt A):129-40. doi:10.1016/j.toxicon.2015.08.014
6. Locatello LG, Licci G, Maggiore G, Gallo O. Non-Surgical Strategies for Assisting Closure of Pharyngocutaneous Fistula after Total Laryngectomy: A Systematic Review of the Literature. *J Clin Med*. Dec 24 2021;11(1)doi:10.3390/jcm11010100
7. Capaccio P, Torretta S, Osio M, et al. Botulinum toxin therapy: a tempting tool in the management of salivary secretory disorders. *Am J Otolaryngol*. Sep-Oct 2008;29(5):333-8.

8. Steffen A, Hasselbacher K, Heinrichs S, Wollenberg B. Botulinum toxin for salivary disorders in the treatment of head and neck cancer. *Anticancer Res*. Nov 2014;34(11):6627-32.
9. Corradino B, Di Lorenzo S, Moschella F. Botulinum toxin A for oral cavity cancer patients: in microsurgical patients BTX injections in major salivary glands temporarily reduce salivary production and the risk of local complications related to saliva stagnation. *Toxins (Basel)*. Oct 24 2012;4(11):956-61. doi:10.3390/toxins4110956
10. Marchese MR, Di Cesare T, De Corso E, Petracca M, Oliveto G, Almadori G. Botulinum Neurotoxin A in the Treatment of Pharyngocutaneous Fistula after Salvage Surgery in Head and Neck Cancer Patients: Our Preliminary Results. *Curr Oncol*. Sep 28 2022;29(10):7099-7105. doi:10.3390/curroncol29100557
11. Guntinas-Lichius O, Eckel HE. Temporary reduction of salivation in laryngectomy patients with pharyngocutaneous fistulas by botulinum toxin A injection. *Laryngoscope*. Jan 2002;112(1):187-9. doi:10.1097/00005537-200201000-00033
12. Marchese MR, Almadori G, Giorgio A, Paludetti G. Post-surgical role of botulinum toxin-A injection in patients with head and neck cancer: personal experience. *Acta Otorhinolaryngol Ital*. Feb 2008;28(1):13-6.