Transoral Tubed Supraglottoplasty

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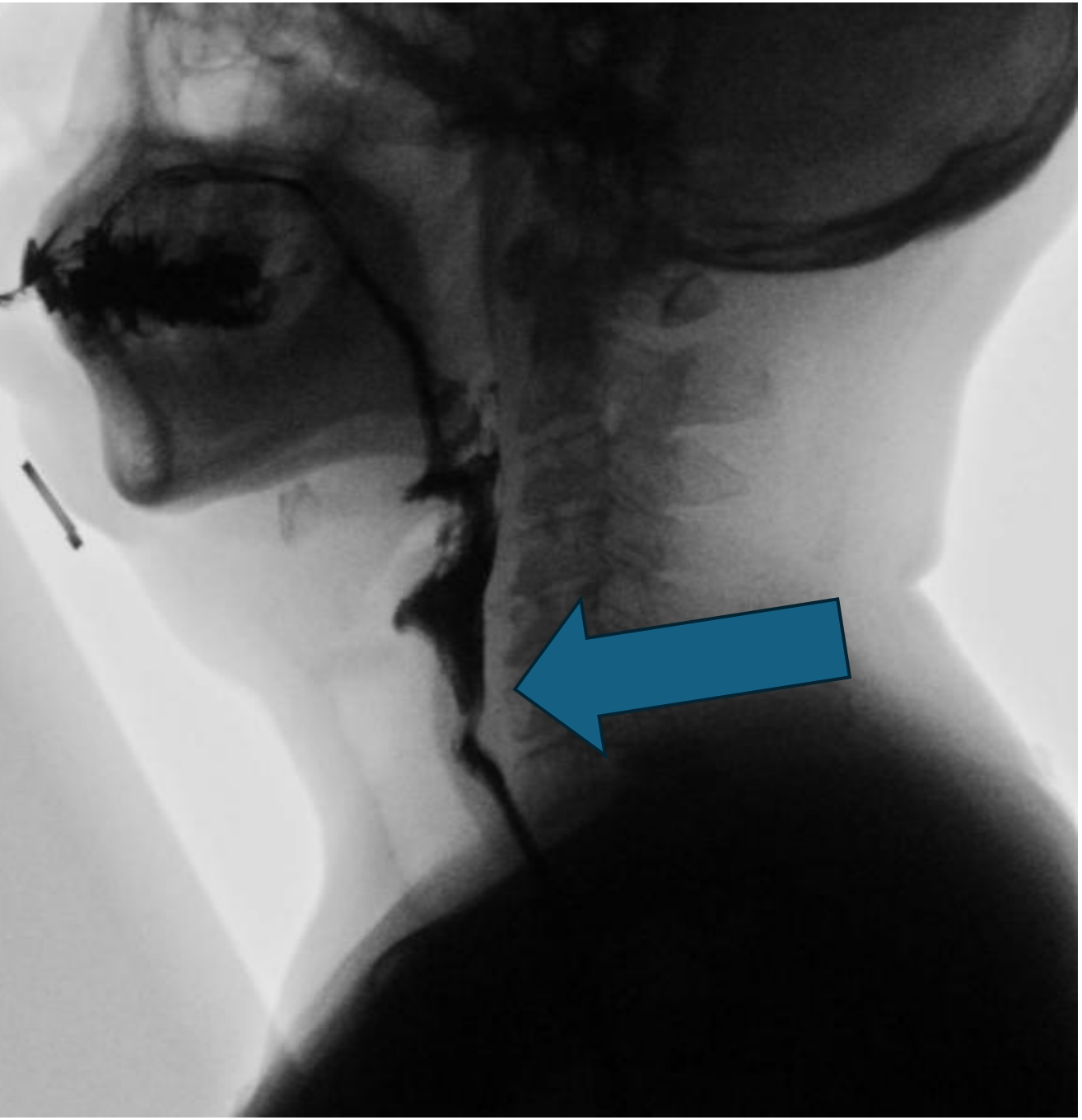
- 73 year male
- Chief complaint: hoarseness for 3 years
- Past history: ICH in 2015-03

Treatment course

- 2018-03-29: right VF palsy s/p VF HA injection
- 2018-10-04: right VF palsy s/p VF steroid injection
- 2019-08-06: right VF palsy+ cricopharyngeal bar s/p fat injection + UES balloon dilatation
- 2021-03-02: dysphagia s/p cricopharyngeal myotomy
- 2025-02-25: dysphagia s/p balloon dilatation + botox injection at CP muscle

Image study

- 2019-01-04 VFSS cricopharyngeal bar



- MBS(modified barium swallowing test): limited UES opening, weak pharynx contraction dilated pyrifrom, no aspiration, CP bar

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Article

Transoral Tubed Supraglottoplasty: A New Minimally Invasive Procedure for Aspiration

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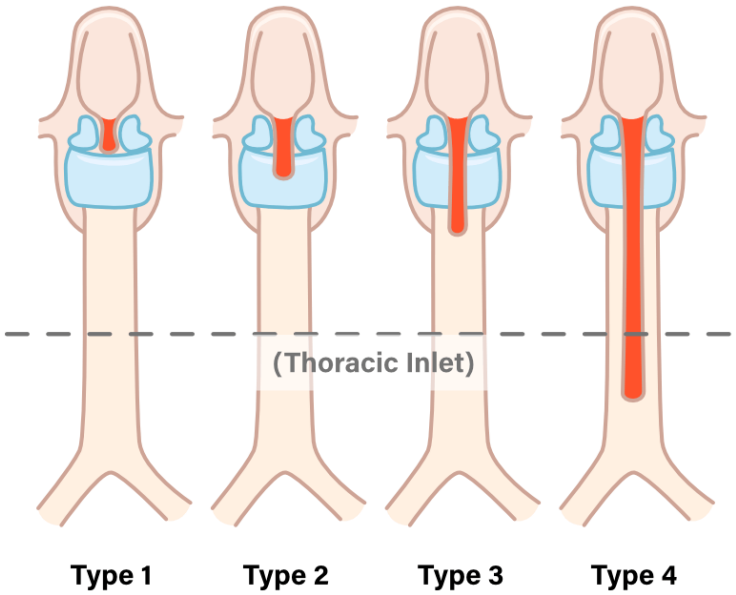
Introduction

- Chronic aspiration can lead to severe complications such as pneumonia and dependence on a gastrostomy tube (G-tube).
- Traditional surgical options are often invasive and irreversible.
- Introduce a minimally invasive, transoral approach—Tubed Supraglottoplasty (TS)—to improve swallowing function and reduce aspiration.

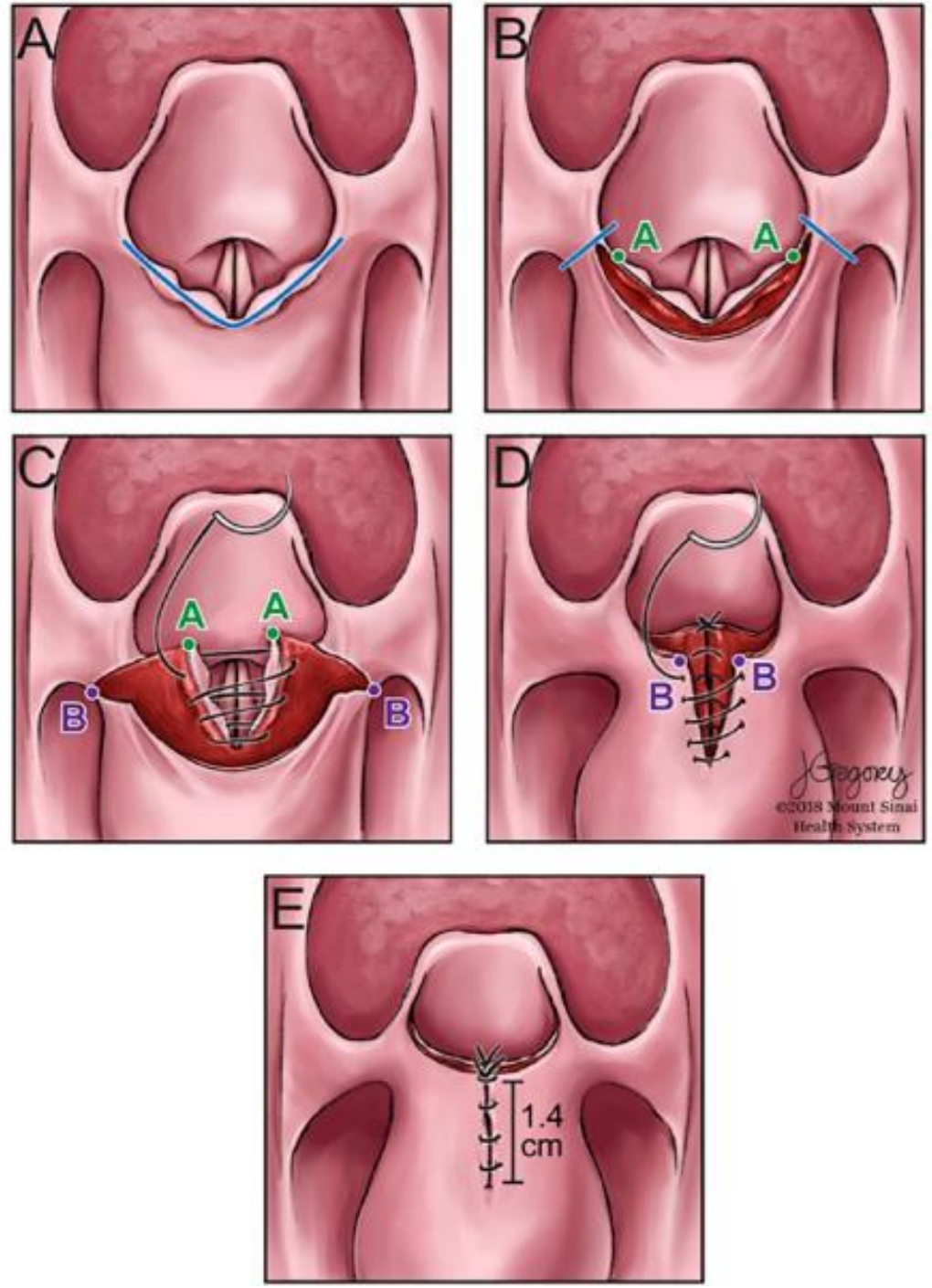
Background

- The concept of "tubed epiglottoplasty" was first proposed to avoid laryngectomy after total glossectomy.
- Similar techniques are used for treating laryngeal clefts.
- TS modifies and extends these techniques to address aspiration in selected patients.



Method

- **Study Design:** Retrospective review (2003–2018) of 11 patients who underwent TS.
- **Inclusion Criteria:**
  - Vocal fold paralysis with aspiration.
  - Failure of previous aspiration management procedures.
  - No central neurological disorders affecting swallowing.
- **Surgical Technique:**
  - Suspension laryngoscopy with endotracheal tube placement.
  - Incision along the aryepiglottic (AE) folds.
  - Creation of mucosal flaps and V-Y advancement closure.
  - Suturing to narrow the supraglottic airway and elevate the posterior laryngeal wall.


A
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E
1.4 cm

Table 1. Patient Characteristics.

Patient No.	Age at Surgery, y	Sex	Primary Diagnosis	Prior Surgeries for Dysphagia and Aspiration
1	81	M	High vagal paralysis secondary to glomus tumor, tongue paralysis	Arytenoid adduction medialization laryngoplasty, CP myotomy
2	71	M	Bilateral vocal cord paralysis secondary to metastatic lung cancer	Injection medialization laryngoplasty
3	75	M	Bilateral vocal cord paralysis secondary to sarcoidosis	Injection medialization laryngoplasty
4	79	M	Left vocal cord paralysis after thyroid surgery, cleft palate	Arytenoid adduction medialization laryngoplasty, CP myotomy
5	82	M	Superior laryngeal nerve injury, insensate larynx	Injection medialization laryngoplasty
6	82	M	High vagal paralysis secondary to brainstem stroke	Botox injection to CP muscle
7	78	M	Vocal cord paralysis after carotid endarterectomy, prior laryngeal radiation	Injection medialization laryngoplasty
8	69	M	Right vocal cord paralysis after tracheal resection	Arytenoid adduction medialization laryngoplasty, CP myotomy
9	74	F	Idiopathic vocal cord paralysis, heart failure	Injection medialization laryngoplasty
10	75	F	Esophagectomy, vocal cord paralysis	Medialization laryngoplasty
11	80	M	Melanoma, palate surgery and radiation, vocal cord paralysis	Injection laryngoplasty

Abbreviation: CP, cricopharyngeal.

Post op care

- If PEG→ start PEG feeding after surgery
- If oral feeding→ POD 1 start feeding
- MBD with antibiotics, anti-acid therapy, pain medicine
- Swallowing exam performed on POD 14
- Whether remove PEG?
  - Depends on VFSS and patient’ s own report of swallowing function

Evaluation

- **Endoscopic Images:** Pre- and post-operative laryngoscopic views demonstrating airway narrowing and improved supraglottic structure.
- **Barium Swallow Studies:**
  - Preoperative: Significant aspiration and penetration.
  - Postoperative: Reduced penetration, improved swallowing dynamic

Result

- **Patient Demographics:**
  - 11 patients (9 male, 2 female), median age: 78 years.
  - 9 laryngeal paralysis, 1 brain stem stroke, 1 insensate larynx with severe atrophy
  - Median follow-up time: 12 months
  - All patient had previous procedure for aspiration(injection laryngoplasty, medialization laryngoplasty, arytenoid adduction)
- **Outcomes:**
  - 10/11 patients reported improved swallowing function.(other 1 lost f/u)
  - 6/8 patients successfully transitioned from G-tube to oral feeding.
  - Postoperative assessments showed reduced aspiration and better functional oral intake.

Result

- The median Functional Oral Intake Scale before surgery was 2.4 ± 1.6. After TS the median Functional Oral Intake Scale changed to 6.0 ± 1.2, $p < .001$ (Student paired t-test)

- **Complications:**
  - No major airway obstruction or need for tracheostomy.
  - Mild postoperative discomfort.

Table 2. Clinical Swallowing Results After TS.

Patient No.	Preoperative Feeding	Postoperative Feeding	Functional Oral Intake Scale Pretreatment	Functional Oral Intake Scale Posttreatment	Follow-up Duration (Months)
1	Gastric tube	Oral feeding	2	6	7
2	Gastric tube	Oral feeding	2	7	14
3	Restricted oral feeds	No restrictions	4	7	11
4	Gastric tube	Oral feeding	1	7	60
5	Gastric tube	Oral feeding	2	6	36
6	Gastric tube	Oral feeding	1	6	19
7	Gastric tube	Oral feeding	1	6	4
8	Gastric tube	Oral feeding	2	6	60
9	Restricted oral feeds	No improvement	5	Not available	1
10	Restricted oral feeds	No restrictions	5	7	12
11	Gastric tube	Improved oral feeds	1	3	3

Note. Functional Oral Intake Scale—Level 1: nothing by mouth; Level 2: tube dependent with minimal attempts of food or liquid; Level 3: tube dependent with consistent oral intake of food or liquid; Level 4: total oral diet of a single consistency; Level 5: total oral diet with multiple consistencies, but requiring special preparation or compensations; Level 6: total oral diet with multiple consistencies without special preparation, but with specific food limitations; Level 7: total oral diet with no restrictions.

FOIS Levels (7-Point Scale)

	Description
1	**Nothing by mouth (NPO)** – Completely dependent on non-oral feeding (e.g., nasogastric tube, PEG)
2	**Tube-dependent with minimal oral intake** – Small, occasional oral intake but still primarily reliant on enteral feeding
3	**Tube-dependent with consistent oral intake** – Regular oral intake of certain food/liquid, but still requires tube feeding
4	**Total oral diet, single consistency only** (e.g., pureed diet, thickened liquids)
5	**Total oral diet with multiple consistencies, but requiring modifications** (e.g., chopped food, thickened liquids)
6	**Total oral diet with minimal restrictions** (e.g., avoiding certain textures like dry or hard foods)
7	**Total oral diet with no restrictions** – Normal diet, no limitations

Table 3. Preoperative and Postoperative BAS or MBS, and Preoperative and Postoperative PEG status.

Patient No.	Preoperative MBS or BAS	Postoperative MBS or BAS	Preoperative PEG Status	Postoperative PEG Status	Months Follow-up
1	Silent aspiration	Mild penetration	Yes	No	7
2	Frank aspiration BAS canceled	No aspiration with chin tuck	Yes	No	14
3	Moderate aspiration	No aspiration	No	No	11
4	Silent aspiration pooling	Passed MBS	Yes	No	60
5	Moderate tracheal aspiration	Penetration with liquid	Yes	No	36
6	Penetration and aspiration	No aspiration	Yes	Yes, not using	19
7	Diffuse aspiration penetration	Penetration with liquid	Yes	Yes, not using	4
8	NA	NA	Yes	No	60
9	Aspiration and penetration	NA	No	Info not available	1
10	Pooling with silent aspiration	No aspiration, pooling	No	No	12
11	Aspiration and penetration	NA	Yes	Yes	3

Abbreviations: BAS, barium swallow; MBS, modified barium swallow; NA, not available for review; PEG, percutaneous endoscopic gastrostomy.

Although residual pooling was noted on barium swallow, no patients had ongoing aspiration

Discussion

- **Advantages of TS:**
  - Minimally invasive.
  - Preserves airway function and phonation.
  - Reduces aspiration risk while maintaining oral feeding ability.
- The tube supraglottoplasty
  - Advances the height of the posterior wall of the larynx by 1 to 2 cm in height
  - Creates a deeper pyriform sinus and serves as a better barrier against penetration and aspiration.
  - By suturing of the AE folds, the opening of the supraglottic larynx is reduced. This reduced area is quite adequate for respiration, although it is narrower.

Discussion

- **Comparison with Traditional Surgeries:**
  - Avoids destructive procedures like total laryngectomy or glottic closure.
  - Less morbidity compared to open epiglottoplasty.
- **Limitations & Future Considerations:**
  - Small sample size.
  - Requires further validation in broader patient populations.
  - Retrospective study
    - Limited the procedure in this series to alert patients with peripheral nerve injury
      - avoided performing the procedure on patients whose aspiration was due to head injury, stroke, or neurological degeneration.

Conclusion

- Transoral Tubed Supraglottoplasty (TS) is a safe and effective procedure for managing aspiration in select patients with vocal fold paralysis.
- Potential for expanded applications in treating other swallowing disorders.
- Further studies needed to refine indications and assess long-term outcomes.