

# Complications of Long-Term Tracheostomy and Management Strategies

Christine J. Colasacco BS,<sup>1</sup> Elizabeth Kim MD,<sup>2</sup> Tara Doherty DO<sup>2</sup>  
1- New York Medical College, School of Medicine, Valhalla, NY  
2- Westchester Medical Center, Department of Anesthesiology, Valhalla, NY

## Introduction

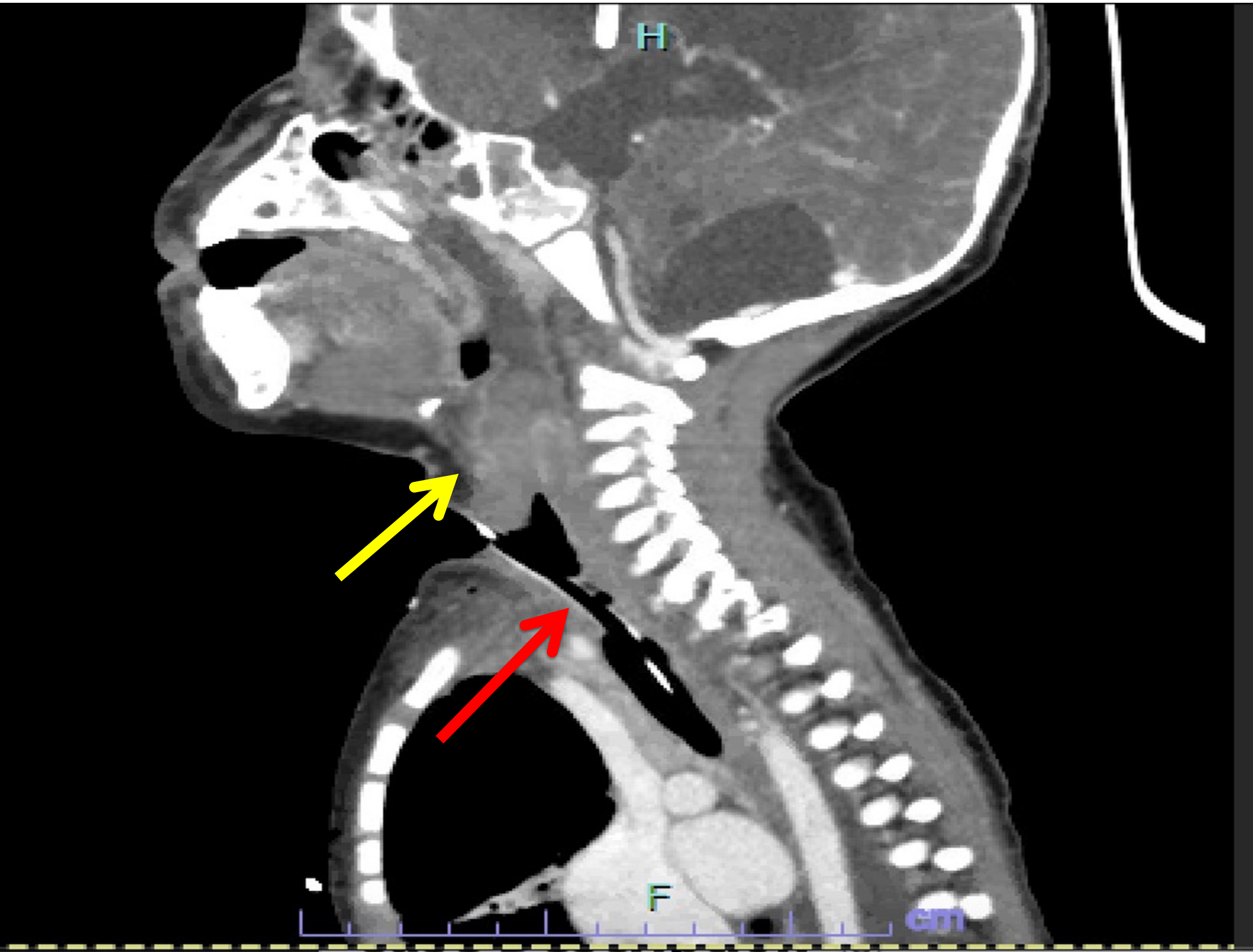
- **Long term trach complications include:** airway obstruction (mucus plugging); accidental decannulation; stomal problems (**granuloma**, tracheocutaneous fistula); tracheal lesions (**subglottic stenosis**, suprastomal collapse, granuloma); hemorrhage (stomal, tracheal mucosa, tracheoinnominate fistula); tracheoesophageal fistula; swallowing problems<sup>1</sup>
- **Tracheal stenosis:** 50% occlusion- stridor, tachypnea; 75% occlusion- extreme respiratory insufficiency<sup>2</sup>
- **Risk factors for tracheal stenosis with tracheostomy include:** cuff trach; trach tube too high in the airway; trauma; previous endotracheal intubation; low-grade inflammation, as seen in uncontrolled reflux<sup>1</sup>

## Perioperative Management

- 2-year-old male with history of extreme prematurity (22 weeks), Dandy Walker Syndrome and tracheomalacia requiring tracheostomy since infancy presented for **increased work of breathing**
- Initial evaluation:
  - **Physical exam:** Inadequate chest rise; 3.5 mm custom trach in situ; ventilation via ambu bag
  - **SpO2:** 70s
  - **VBG:** 6.97/>128/102 pH/pCO2/pO2
- Tracheoscopy demonstrated 1 cm of **tracheal stenosis** distal to the tracheostomy tube causing **partial obstruction**
- To bypass the obstruction, the **3.5 mm cuffed tracheostomy tube was replaced with a 3.0 mm cuffed endotracheal tube**
- To optimize ventilation, **fentanyl and rocuronium** were administered, which resulted in improved tidal volumes

## Perioperative Management Cont.

- With **extracorporeal membrane oxygenation (ECMO) on standby**, the patient was then taken to the OR for tracheostomy exchange, stomaplasty, direct laryngoscopy (DL), and bronchoscopy
  - **Anesthesia:** General
  - **Induction:** Propofol, rocuronium
  - **Maintenance:** Sevoflurane, fentanyl, rocuronium
- DL revealed a 5 cm **tracheal mass** extending from the suprastomal region to 2 cm above the glottis
- The patient returned to the OR the following week for the tracheal mass resection and subsequently required **custom trach secondary to recurrent restenosis**



Sagittal CT Neck. Yellow arrow: tracheal mass. Red arrow: tracheal stenosis

## Discussion

- In the setting of airway compromise secondary to tracheal stenosis, placement of a **smaller diameter tube** (ETT or tracheostomy tube)<sup>3</sup>, **oral intubation** or **jet ventilation**<sup>4</sup> can be considered
- Emergent backup measures such as **ECMO** should be in place<sup>2</sup>, along with **collaboration** with surgical colleagues
- Here, comprehensive airway evaluation revealed a secondary obstruction that could hinder oral intubation
- The use of **paralytics** allowed for chest wall and diaphragm relaxation while **positive pressure ventilation** helped to overcome small tube diameter
- Anesthetic management for any airway obstruction is **situation-and-provider dependent**
  - Traditional management: volatile inhalation by facemask; if apnea occurs, agent uptake halted, anesthesia lightens, and spontaneous ventilation resumed<sup>5</sup>
  - Spontaneous ventilation could also be maintained through a targeted-controlled propofol infusion<sup>6</sup>
  - However, with spontaneous ventilation, negative intrathoracic pressure occurs on inspiration, drawing in tracheal segments, causing further narrowing, in turn, limiting inspiratory flow <sup>5</sup>
  - Mechanical ventilation maintains tracheal patency through positive intratracheal pressure<sup>5</sup>
  - Mechanical ventilation with sedation and paralytic can optimize ventilation

## Conclusion

- Long term tracheostomy can pose several complications leading to airway compromise and critical airways
- There are several strategies to manage tracheal stenosis
- In this acute setting, tube exchange, paralytics, and positive pressure ventilation were used in conjunction to obtain adequate tidal volumes

## REFERENCES

