

Background

- Tracheomalacia (TM) is associated with significant morbidity and mortality
- Abnormally compliant trachea leads to exaggerated collapse and obstruction with expiration
- Caused by: impaired cartilage integrity or external impingement of adjacent intrathoracic structures
- Treatment based on etiology and severity
- Thoracoscopic posterior tracheopexy – minimally invasive, novel approach to treatment
- Posterior trachea sutured to the anterior longitudinal spinal ligament under fiberoptic bronchoscopic guidance
- Challenging anesthetic because it requires both operative intraluminal FOB guidance and lung isolation in complex patients

Past Medical History

- 13.5 kg, 3-year-old female
- Chromosomal deletion syndrome (46XX del 2q37.1)
- Cervical subluxation at C3-4, foramen magnum stenosis resulting in hydrocephalus and subsequent VP shunt
- Obstructive sleep apnea on BiPAP
- Chronic lung disease on oxygen (1L/min O₂ NC)
- CT imaging - 53% of the tracheal AP diameter at the level of the brachiocephalic artery

Figure 1

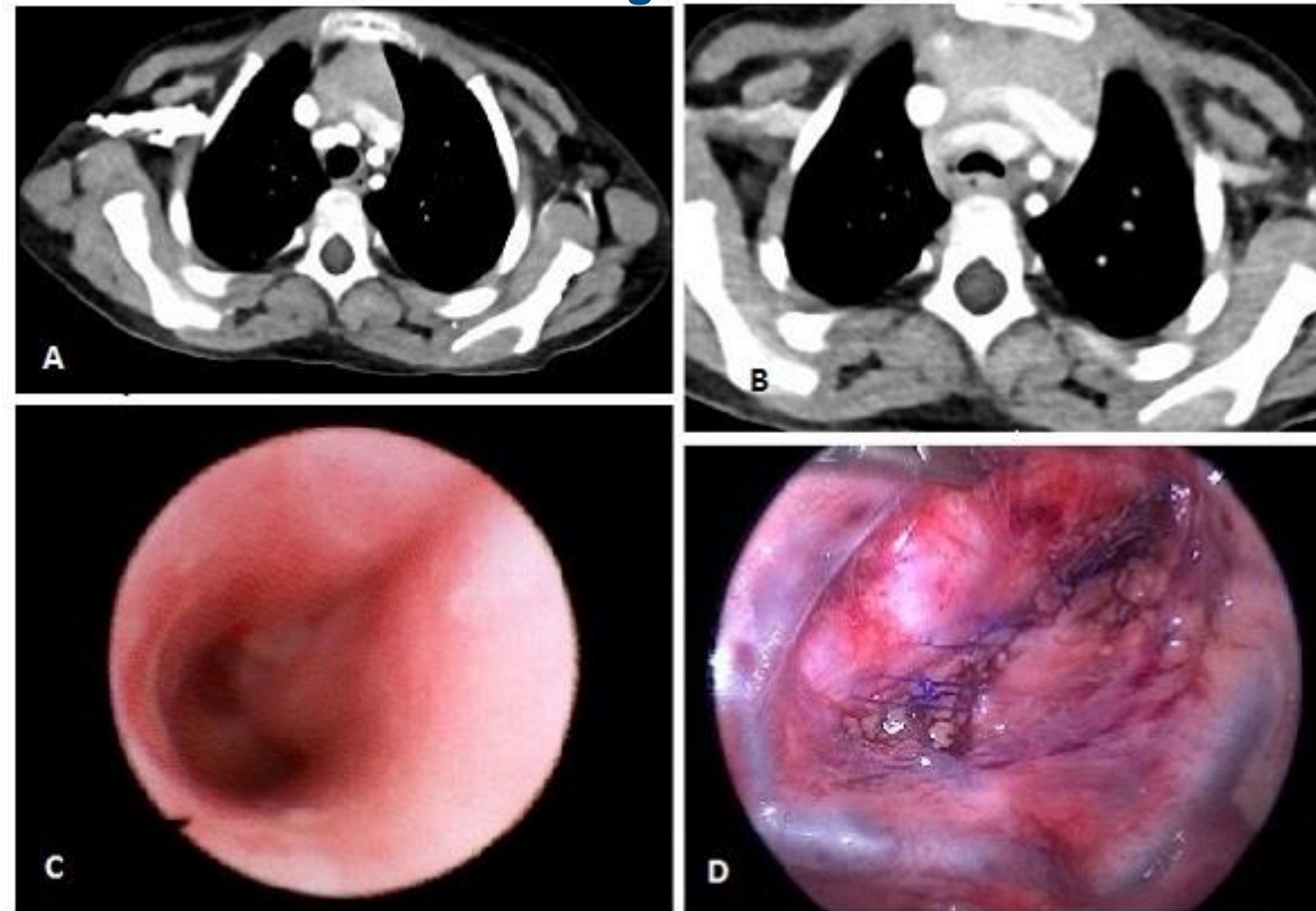


FIGURE 1:

- **A/B** – CT scan of chest during inspiration and expiration respectively – highlights tracheal collapse
- **C** – bronchoscopic image of tracheal lumen after surgery completion
- **D** – thoracoscopic image of suture placement at surgery completion

Unique challenges

- New surgical approach with competing surgical and anesthetic needs:
- Surgical correction requires:
 - Operative FOB guidance for placement of tracheal sutures
 - Lung isolation for external visualization of the trachea
- Anesthetic challenges:
 - Traditional one-lung ventilation techniques precluded (endobronchial intubation / endobronchial blocker) → FOB must be placed through ETT for operative guidance
 - Cross-sectional ETT diameter is too narrow to accommodate fiberoptic scope and bronchial blocker without significantly impacting ventilation
 - Lung isolation effectively achieved with bronchial blocker placed extraluminally

Intraoperative Course

- SSEP monitoring for a history of cervical subluxation - inhalational induction transitioned to TIVA
- Intubated with a cuffed 3.5 ETT
- Lung isolation with EXTRAluminal 5F Arndt endobronchial blocker (AEB) in the right main stem
- Orogastric tube placed to aid in surgical identification of the esophagus
- Positioned in left lateral decubitus for a right thoracoscopy
- Endoluminal FOB used to assist in suturing the posterior trachea to the anterior spinal ligament
- HD stable throughout, SSEPs intact, extubated to BiPAP at the end of the procedure

References

- Shieh HF, Smithers CJ, et al. Posterior tracheopexy for severe tracheomalacia. J Pediatr Surg. 2017; 52(6): 951-55