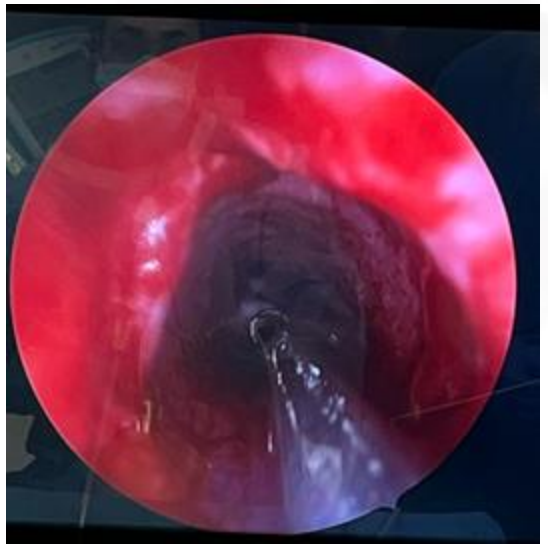
Penn Medicine

Department of Anesthesiology and Critical Care

Combined Cesarean Delivery and Tracheal Dilation in a Parturient with Subglottic Stenosis

Julia Epelbaum, MD, Huafeng Wei, MD, Allison Lee, MD, MS



Background: Idiopathic Subglottic Stenosis

- Characterized by fibrosis of subglottic larynx
- Etiology uncertain – assoc. w/ progressive dyspnea, hoarseness and cough; frequently mistaken for asthma; recurrent in nature (restenosis 40-95%)
- Primarily affects female sex, 20-40 years old
- Inadequate treatment long term → pulm. HTN and edema, resp failure
- Usual treatment – periodic dilation, cricotracheal resection and tracheostomy
  - Endoscopic dilation (rigid or balloon) w/w-out radial incisions, cryotherapy, mitomycin C and local steroid application
- Rare in pregnancy (1:400,000); no management consensus and variable mx reported [1,2]
- Physiologic changes of pregnancy exacerbate dyspnea and ability to tolerate labor
- Few case reports earlier in pregnancy of mx ranging from no intervention, dilation with inhaled anes/IV sedation and non-invasive ventilation, tracheotomy; [2] risks-maternal hypoxia, acidosis, aspiration, preterm labor; fetal hypoxia/acidosis

- Ours is first report of parturient with symptomatic subglottic stenosis to undergo **combined elective CD and tracheal balloon dilation with apneic ventilation**

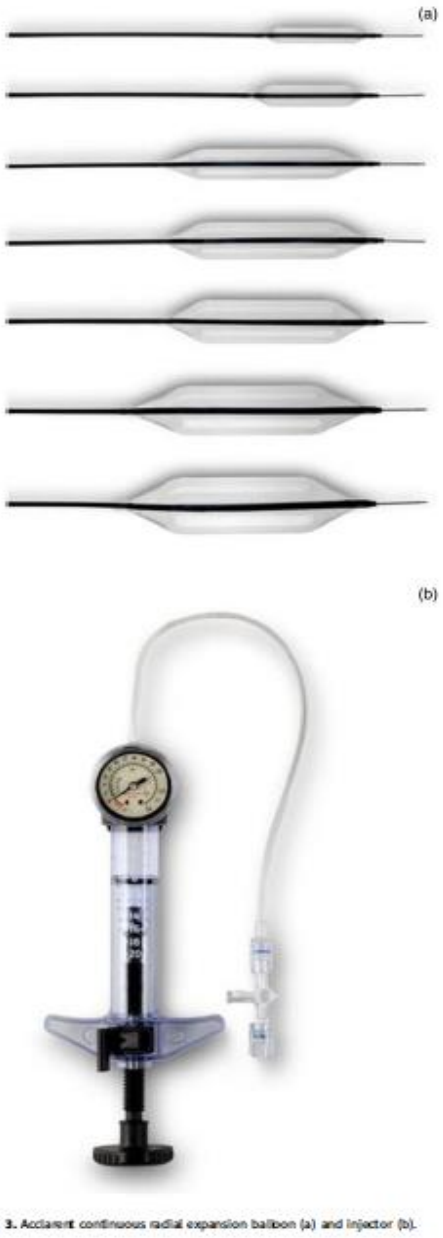


Fig. 3. Acclarent continuous radial expansion balloon (a) and injector (b).

1. Laryngoscope. 2024 Mar;134(3):1014-1022.
2. J Laryngol Otol. 2019 May;133(5):399-403.

Case Report

- 31y.o F, G3P2, 36 weeks' gestation, BMI 34 kg/m^2, with asthma presented with dyspnea, stridor and acute respiratory syncytial virus infection
- Workup revealed grade 3 subglottic stenosis
- No prior intubations or h/o autoimmune disease - likely idiopathic
- **Medical Treatment**: IV dexamethasone, bronchodilators, NC O_2 4L/min
- **Surgical intervention:** Cesarean delivery directly followed by airway dilation
  - *Cesarean delivery with spinal anesthesia*
    - HFNC O_2 at 40L/min and aspiration prophylaxis provided
    - Lidocaine infiltration- anterior neck in case of awake surgical airway
  - *Direct Laryngoscopy, tracheal balloon dilation w/ GA – TIVA, rocuronium for stable field*
    - supraglottic jet ventilation (SpO2 85-99%, etCO2 max: 65) [3]
    - After emergence, immediate improvement in symptoms of hoarseness, shortness of breath, and stridor

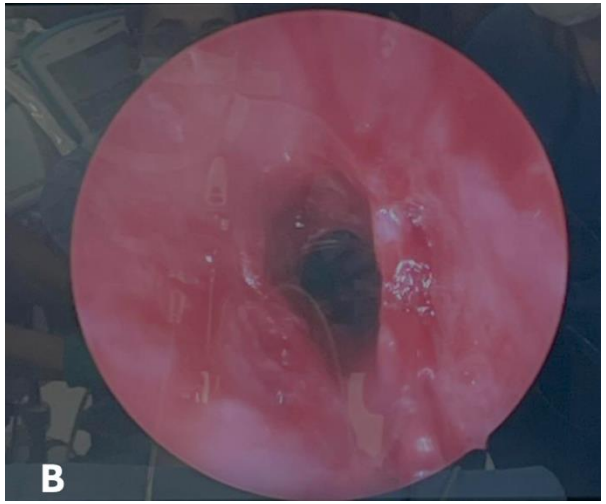


Figure: A –Bronchoscopic image showing Grade 3 subglottic luminal obstruction (between 71% - 99%). B – Subglottic larynx post-dilation.

3. Clin Otolaryngol. 2020 Mar;45(2):253-258.

Discussion and Learning Points

- Subglottic stenosis combined with physiologic changes of pregnancy can lead to life-threatening airway obstruction and inability to safely tolerate labor

- In this case, patient's symptoms were refractory to medical treatment and urgent airway intervention was deemed necessary
- Several treatment options were considered:
  - *Performing tracheal dilation before delivery with apneic ventilation*
    - Concern for risking emergency cesarean delivery in case of intraoperative hypoxemia and hypercarbia
  - *Securing airway with awake tracheotomy*
    - considered last resort due to its invasiveness, intraoperative risks and delayed complications.

- **Sequential cesarean delivery with neuraxial anesthesia and airway management by an interdisciplinary team allowed for controlled, safe conditions for mother and fetus**