

IMAGES IN EMERGENCY MEDICINE

Pediatrics

An infant with stridor and hypoxemia

Galina Lipton MD | Joshua Nagler MD, MHPed

From Division of Emergency Medicine, Boston Children's Hospital, Boston, Massachusetts, USA

Correspondence

Galina Lipton, MD, Division of Emergency Medicine, Children's Hospital, 300 Longwood Avenue, Boston, MA 02115, USA.

Email: Galina.Lipton@childrens.harvard.edu**KEYWORDS**

complete tracheal rings, pulmonary artery sling, stridor, upper airway obstruction

1 | PATIENT PRESENTATION

A 6-month-old boy presented to the emergency department (ED) with a 2-day history of nasal congestion, cough, and stridor at rest. His family had noted similar sounds intermittently since birth. He was well appearing, afebrile, respiratory rate was 44 bpm, and oxygen saturation was 94% on room air. He had biphasic stridor and moderate retractions, without wheezing or other adventitious sounds. There

was minimal improvement after nebulized racemic epinephrine and dexamethasone. A chest radiograph was obtained (Figure 1). The clinical presentation and radiographic findings prompted transfer to the operating room for bronchoscopy (Figure 2) and post-procedure admission to the pediatric intensive care unit for further workup including a computed tomography angiography (CTA) of the chest (Figures 3 and 4 and Videos 1 and 2). He ultimately underwent pulmonary artery reimplantation and slide tracheoplasty.

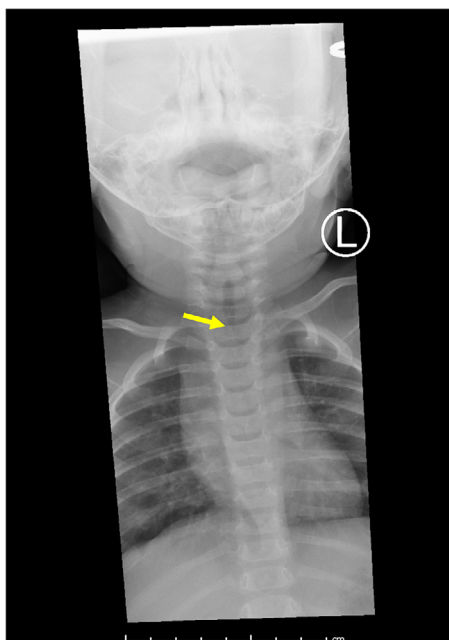


FIGURE 1 Chest radiograph demonstrating limited view of the narrowed air column (yellow arrow) past the thoracic inlet

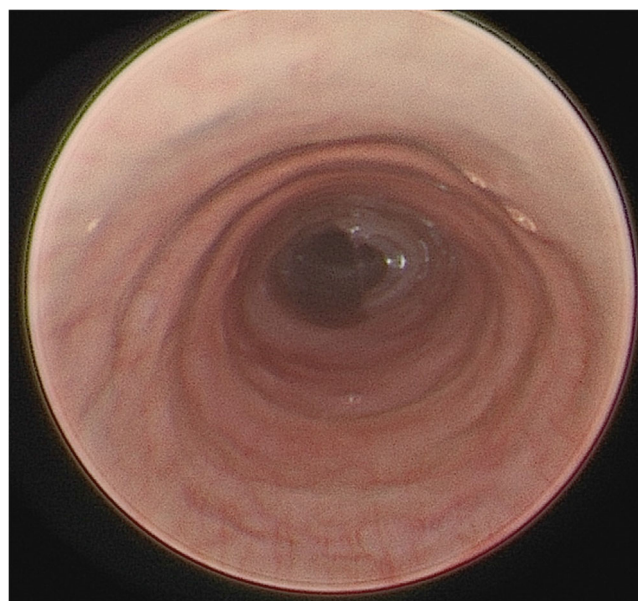


FIGURE 2 Image from bronchoscopy showing complete tracheal rings with a small amount of inflammation and purulence

This is an open access article under the terms of the [Creative Commons Attribution-NonCommercial-NoDerivs](https://creativecommons.org/licenses/by-nc-nd/4.0/) License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

© 2020 The Authors. *JACEP Open* published by Wiley Periodicals LLC on behalf of the American College of Emergency Physicians.

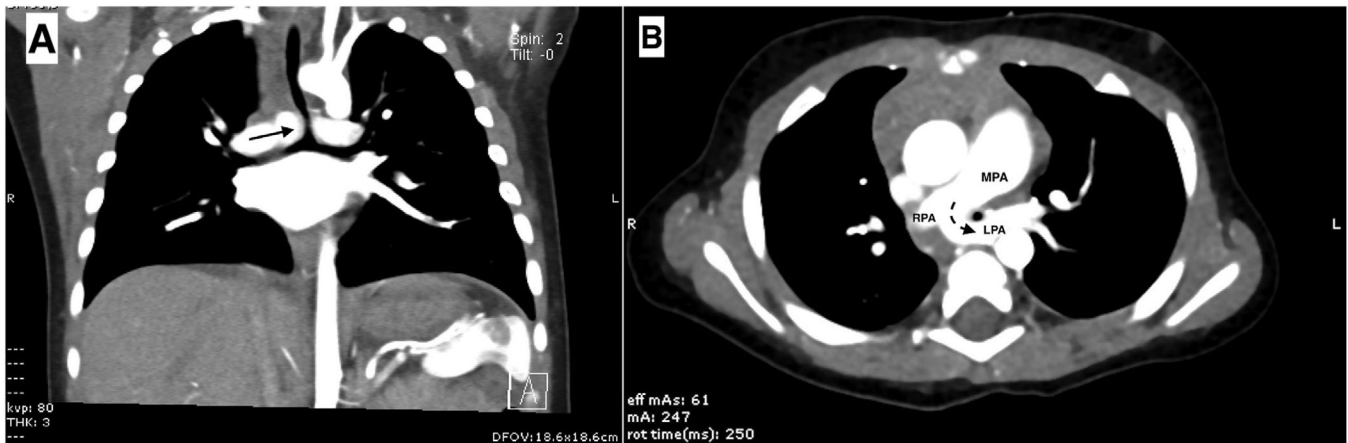


FIGURE 3 CT angiogram of the chest demonstrating (A) tracheal narrowing. The caliber of the distal trachea (arrow) is noted to be smaller than the left and right main bronchi, resulting in obstructive physiology. (B) Coming off the main pulmonary artery (MPA) are the right pulmonary artery (RPA) and the left pulmonary artery (LPA). The left pulmonary sling (dashed arrow) can be seen coursing around the narrowed trachea (measuring only 2.5 mm in diameter at that point)

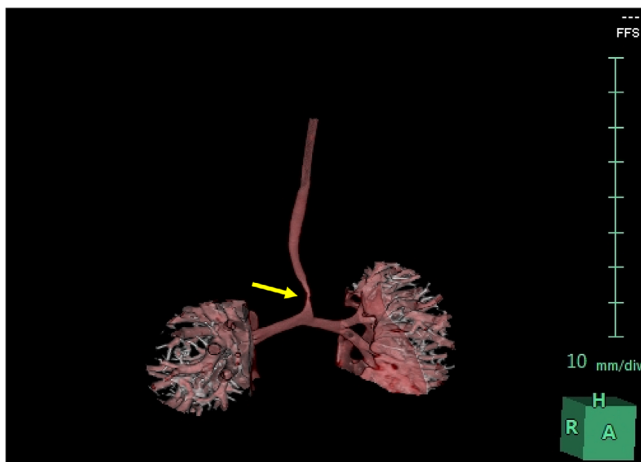


FIGURE 4 3D CT reconstructions of the airway demonstrating severe tracheal narrowing (yellow arrow)

2 | DIAGNOSIS

2.1 | Complete tracheal rings and pulmonary artery sling

Stridor in children signifies upper airway disease. Hypoxemia is rare unless there is concurrent lower respiratory infection or the degree of obstruction is so severe that it results in hypoventilation, in which case patients should present in extremis. Radiographs can be helpful in stridulous children in whom the etiology is unclear, the severity of illness is concerning, or there are atypical features in the presentation.

Complete tracheal rings represent a rare congenital anomaly of the trachea that results in airway narrowing.¹ More than 75% of patients have associated anomalies.² Our patient had a pulmonary artery sling, in which the pulmonary artery courses across the trachea resulting in compression. The most common symptom is stridor; however, children may also present with respiratory distress or feeding difficulties.³ Management is surgical, including pulmonary artery re-implantation and

slide tracheoplasty to increase diameter and allow growth of the tracheal rings.⁴⁻⁶

Our patient was diagnosed using radiographs and CT scans. Ultrasound has emerged as an alternative means of airway assessment that is available at the bedside and avoids exposure to ionizing radiation. Ultrasound is newly emerging as a tool for airway assessment of children.⁷ Currently, its use in pediatric emergency medicine is limited although it may play an important role in the future.

VIDEO 1: 3D CT reconstructions of the airway demonstrating tracheal narrowing.

VIDEO 2: 3D CT reconstructions of the vasculature demonstrating pulmonary artery sling.

REFERENCES

- Landry AM, Rutter MJ. Airway anomalies. *Clin Perinatol*. 2018;45(4):597-607.
- Schweiger C, Cohen AP, Rutter MJ. Tracheal and bronchial stenoses and other obstructive conditions. *J Thorac Dis*. 2016;8(11):3369-3378.
- Licari A, Manca E, Rispoli GA, Mannarino S, Pelizzo G, Marseglia GL. Congenital vascular rings: a clinical challenge for the pediatrician. *Pediatr Pulmonol*. 2015;50(5):511-524.
- Wilcox LJ, Hart CK, de Alarcon A, et al. Unrepaired complete tracheal rings: natural history and management considerations. *Otolaryngol Head Neck Surg*. 2018;158(4):729-735.
- Terada Y, Nakayama E, Sakaguchi Y, Kono T, Noda H. Airway compression by the ascending aorta due to a thin thoracic cage. *Gen Thorac Cardiovasc Surg*. 2009;57(2):108-110.
- Gallagher TQ, Hartnick CJ. Slide tracheoplasty. *Adv Otorhinolaryngol*. 2012;73:58-62.
- Stafrace S, Engelhardt T, Teoh WH, Kristensen MS. Essential ultrasound techniques of the pediatric airway. *Paediatr Anaesth*. 2016;26(2):122-131.

How to cite this article: Lipton G, Nagler J. An infant with stridor and hypoxemia. *JACEP Open*. 2020;1:1765-1766.
<https://doi.org/10.1002/emp2.12310>