Introduction

Tracheomalacia is characterized by flaccidity of the supporting tracheal cartilage, widening of the posterior membranous wall, and reduced anterior-posterior airway character. This contributes to tracheal collapse, especially during times of increased airway flow, such as coughing, crying or feeding. The three categories of tracheomalacia include:

I. congenital or intrinsic tracheal abnormalities associated with TEF or esophageal atresia. Thought to be caused by immaturity of the tracheobronchial cartilage.
II. extrinsic defects or anomalies such as vascular ring causing compression of the trachea
III. acquired tracheomalacia, which typically occurs with prolonged intubation, or tracheal infections.

Types II and III are thought to be due to degeneration of previously health cartilage.

Here we present a case of intraoperative management of a patient with acquired severe tracheomalacia from scoliosis surgery.

Case Presentation

The patient is a 14-year-old girl with severe perinatal hypoxic ischemic encephalopathy resulting in dystonia and choreoathetoid cerebral palsy managed by a deep brain stimulator. She has severe scoliosis and underwent a spine fusion. Following this surgery, her primary complaint was that her airway felt “cut off” at the level just below the manubrium. The patient suffered a respiratory event at home requiring mouth-to-mouth resuscitation and was evaluated at an outside hospital with concerns for external airway compression.

A CT demonstrated near complete compression of the trachea with severe angulation (Fig. 1), and a bronchoscopic exam demonstrated 90% compression and a counterclockwise rotation of the trachea (Fig. 2). Secondary to decreased thoracic kyphosis after spinal fusion, the patient also had a smaller anterior to posterior dimension, leading to a smaller chest volume which further contributed to her breathing symptoms.

Thus, she came to the operating room for an anterior and posterior tracheopexy with NUSS bar insertion and manubriectomy at our institution.

Intraoperative Management

Prior to going to the operating room, the patient’s deep brain stimulator was turned off to prevent potential for interference with electrocautery. The patient received an inhalation induction, and was kept spontaneously breathing while on inhalation agents and a propofol infusion during direct bronchoscopy exam of the airway by the surgical team. We also had the cardiac anesthesiologist and a cardiopulmonary bypass machine available due to the operation’s proximity to the large vessels and the heart.

We added an arterial line as well as one pulse oximeter on each side for monitoring beyond the standard ASA monitors. Following intubation, we provided continuous real-time flexible bronchoscopy guidance to aid the surgeons in visualizing the trachea as they performed the tracheopexy. Since at the conclusion of the surgery, the trachea was expanded (Fig. 3), and the patient remained intubated to the ICU.