One Lung Ventilation for Thoracoscopic Surgery in an Infant with a Large Congenital Airway Malformation

Amit Bhakta, M.D., Roshan Patel, M.D., Igor Tkachenko, M.D.
Department of Anesthesia & Critical Care, The University of Chicago, Chicago, Illinois.

Introduction

Thoracoscopic surgery in newborns and infants pose the anesthetic challenge of obtaining one lung ventilation. A commonly used technique for the left lung isolation is the right bronchus main stem intubation. The use of balloon-tipped endobronchial blockers (BB) is the technique that is utilized in children younger than 8 years old. We present our experience of the technique for the placement of an Arndt endobronchial blocker (AEB) (Cook Medical, Bloomington, IN) for thoroscopic surgery in an infant with a large congenital pulmonary airway malformation (CPAM).

Case Presentation

A 12 week-old male with prenatally diagnosed left lower lobe CPAM presented for thoroscopic lesion resection. The surgical team suggested that the lung isolation would significantly facilitate the procedure. To facilitate the AEB placement, the size of monofilament guide loop on the AEB was reduced. Additionally, a more rigid bent conformation of the AEB was obtained by bending the AEB proximal to the cuff 30-45 degrees. The AEB was advanced under direct laryngoscopy into the trachea followed by a 3.0 microcuffed ETT placement. A pediatric 2.2 mm fiberoptic bronchoscope (FOB) was advanced through the ETT to visualize carina. The AEB was advanced with manual rotational movements at its proximal end until the small guide loop entered the left mainstem aided by the bent conformation. The balloon was inflated under FOB visualization, and successful one lung ventilation was established. Additional IV and an arterial-line was placed. Upon completion of the procedure the AEB was deflated, and the left lung was re-inflated. The patient was successfully extubated and transported to the PICU.

Conventional Approach

Extraluminal Approach

Thoracoscopic procedures in neonates and infants often performed without lung isolation. Yet, successful one lung ventilation provides superior operating conditions. Extraluminal AEB placement has been well described and is used in infants and small children because ETT with internal diameters less than 4.5 mm cannot simultaneously accommodate a pediatric FOB and a 5F AEB. The BB can be easily advanced in the right mainstem bronchus to achieve a right lung isolation. Placement of a left-sided AEB for the left lung isolation is more difficult due to the steeper angle of takeoff of the left mainstem bronchus from the trachea, and the tendency of the larger sized guide loop to get caught at the carina. To obtain an AEB positioning in the left mainstem bronchus we utilized several maneuvers that involved: (1) reducing the size of the monofilament loop of the AEB and (2) obtaining a bent conformation proximal to the AEB cuff which can facilitate easy and smooth advancement of the balloon tip. Alternative technique when the FOB threaded through the guide loop and the AEB advanced over the FOB into the left bronchus is cumbersome when used with extraluminal BB placement. Placement of the AEB with the reduction of wire loop size and the bend has an advantage of easier redeployment into either mainstem bronchus if it were to be displaced without the difficult and often time consuming a step of threading the FOB through the guide loop.

Discussion

References