Tension Pneumothorax in a Child With CPAM During Lungs Isolation With Fogarty Embolectomy Catheter

Jessie J. Budzinski, MD; Dinesh K. Choudhry, MD
Nemours/Alfred I. duPont Hospital for Children, Wilmington, DE; Thomas Jefferson University, Philadelphia, PA

INTRODUCTION

- Congenital pulmonary airway malformation (CPAM) is one of the most frequent pulmonary maldevelopments
- Presents as a multicystic mass of pulmonary tissue with proliferation of bronchial structures that fail to mature (1)
- Children with CPAM bring challenges to their anesthetic, such as lung isolation
- We discuss a neonate with a right-sided CPAM lesion who, following induction of anesthesia and attempted lung isolation, developed a pneumothorax on the contralateral side with resultant hemodynamic and respiratory compromise

CASE PRESENTATION

- A 5-day-old, 2.6-kg male born at 36 weeks gestation was noted to have respiratory difficulty after birth; chest radiograph revealed a right sided chest mass with mediastinal shift
- Diagnosis of CPAM was made and the child scheduled for a right upper lobectomy using single-lung ventilation
- Anesthesia was induced with atropine, propofol, and rocuronium; after which we mask-ventilated the patient with 2% sevoflurane in 100% oxygen using minimal ventilating pressures
- DL was performed and a 4-Fr Fogarty embolectomy catheter (FC) was inserted until resistance was met; after which, a 3.0 uncuffed ETT was placed after a 3.0 cuffed ETT proved to be too tight
- On visualizing the blocker’s position with FOS it had entered the left main bronchus instead of the intended right main; it was thus redirected into the right side
- Several minutes thereafter, the child had decreasing end-tidal CO2, hypoxia, bradycardia, and respiratory arrest. With no response to albuterol or IV epinephrine administered for possible bronchospasm, we suspected a tension pneumothorax.
- As the child was rapidly decompensating, we had a chest tube placed on clinical grounds alone which resulted in immediate respiratory and hemodynamic improvement

DISCUSSION

- Lung isolation in this population is usually achieved by advancement of the ETT into the bronchus of the nonoperative side or by placing an FC alongside the ETT to block the surgical lung
- The emerging question is, "What caused the pneumothorax on the contralateral lung?"
  We can think of two possibilities: barotrauma from positive pressure ventilation or injury from the FC
- We think trauma is the more likely cause given timing of clinical symptoms
- No supporting literature that a child with CPAM is more prone to a pneumothorax on the contralateral side
- Positive pressure however could have been preferentially directed to unaffected (left side)
- Accidental bronchial injury from overdistension of an FC balloon has been reported
- We learned several things from this case:
  - It may be advisable for the surgery team to be in the OR and have a chest tube readily available should the patient be unable to tolerate positive pressure ventilation (2).
  - When the blocker is placed in the trachea, it should be advanced gently; not until resistance is met (as has been our practice)
  - Special care is required to ensure the blocker is held stationary as ETT is placed so it doesn’t inadvertently get pushed deeper into the lung and cause injury
  - Thought was given to possibly removing the stylet from the FC prior to advancing; however, the blocker may become too floppy and unmanageable.

REFERENCES