

Anesthetic management for lobectomy of a 2-month-old infant with bronchogenic cyst: Case report along with review of literature

ABSTRACT

Bronchogenic cyst, a benign congenital cystic lesion of the lung, is a rare cause of respiratory distress in children comprising 7.5% of all mediastinal masses. A thorough preoperative evaluation is crucial to plan for definitive intra- and post-operative management. All patients should be thoroughly evaluated for the presence of compression, deviation or distortion of airways and great veins. The easiest means of providing one lung ventilation in pediatrics is to intubate the main stem bronchus of the nonoperated lung. Other options available for pediatric one lung ventilation are single lumen endobronchial tubes, micro cuff tubes, Marraro bilumen tubes, and bronchial blockers. We hereby present a case report of a 2-month-old infant posted for excision of bronchogenic cyst along with a review of literature.

Key words: Lobectomy; one lung ventilation; pediatric

Introduction

Bronchogenic cyst, a benign congenital cystic lesion of lung, is a rare cause of respiratory distress in children comprising 7.5% of all mediastinal masses. When these children are posted for surgical excision, they present a great challenge to anesthesiologists. With the use of general anesthesia, the incidence of complications in these patients has been reported to be 7%–18%. Hence, cautious approach should be taken before subjecting these patients to anesthesia.^[1]

Case Report

A 2-month-old male child, weighing 3 kg, diagnosed as a case of bronchogenic cyst antenatally by ultrasound was scheduled for thoracotomy for excision of the cyst. Few

days after birth, he had a cough and labored breathing for which he was given symptomatic treatment by a private practitioner. His general condition improved but again he developed similar complaints after 1 month for which he was referred to our Institute. He was admitted to Pediatric Intensive Care Unit (PICU), where he had febrile seizure, treated symptomatically, put on antiepileptic cover and was posted for excision of the cyst. On examination, the general condition of the child was poor. He had on and off febrile episodes for 10 days. He was tachypneic with a respiratory rate of 58/min along with chest retraction. Heart rate was 144/min. Auscultation of chest revealed decreased air entry on the left side with bilateral wheeze and crepts. Cardiovascular system was unremarkable. Blood biochemistry was normal except total leukocyte count which was 12000.

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Contrast-enhanced computed tomography chest revealed bronchogenic cyst of approximately 50 mm × 40 mm in the left lower lobe. A left thoracotomy and excision of the cyst were planned.

In the operating room, standard monitors were attached. An intravenous line was secured with 24-gauge cannula. Anesthesia was induced with ketamine 6 mg and fentanyl 5 µg. After confirmation of bag and mask ventilation, suxamethonium 6 mg was given to facilitate endotracheal intubation. Trachea was intubated successfully with cuffed endotracheal tube of internal diameter 3.5 mm confirmed by auscultation of chest and capnography. The child was ventilated with low tidal volume and high rate. Anesthesia was maintained with oxygen, sevoflurane and vecuronium. Left femoral artery and right external jugular vein were cannulated. The child was positioned in the right lateral position. Thoracotomy was done. Intraoperatively, cyst was found to be embedded in the lower lobe and lobectomy was planned by the surgeons. During dissection, there were frequent episodes of bradycardia and desaturation for which surgeons were requested to stop every time, and heart rate and saturation improved immediately spontaneously. Surgery lasted for 2 h. At the end of surgery, neuromuscular blockade was reversed and trachea was extubated after criteria for extubation were fulfilled. Postoperatively, the child improved and was shifted to (PICU) after 4 days from where he was discharged after 7 days in a stable and good condition.

Discussion

Bronchogenic cysts are rare congenital pulmonary malformations. Two-thirds are present in mediastinum while remaining are located in the lung parenchyma with a predilection to the lower lobes. Respiratory distress is the most common presentation in pediatric patients, manifested by recurring episodes of a cough, stridor, wheezing, and chest retractions.^[1]

A thorough preoperative evaluation is crucial to plan for definitive intra- and post-operative management. All patients should be thoroughly evaluated for the presence of compression, deviation, or distortion of airways and great veins.

In general, for thoracotomy, one lung ventilation is requested by the surgeon to facilitate surgery and prevent soiling of the dependent lung and double lumen tube (DLT) is used which solves the purpose. The smallest size of available conventional DLT is 26 Fr which is suitable for children above 8 years of age.

The easiest means of providing one lung ventilation in pediatrics is to intubate the main stem bronchus of the nonoperated lung. Standard endotracheal tubes have a low margin of safety if placed in right main stem bronchus because of the possibility of obstruction of upper lobe by the cuff of the tube. However, this can be overcome by the fiber-optic placement of tube. However, pediatric fiberoptic was not available with us. Hence, we intubated the trachea and not the right main stem bronchus.

Other options available for pediatric one lung ventilation are single lumen endobronchial tubes, micro cuff tubes, Marraro bilumen tubes, and bronchial blockers. Single lumen endobronchial tubes are longer than standard endotracheal tubes but with smaller external diameters and smaller cuffs which when inserted into main stem bronchus ventilate that side lung causing spontaneous absorption collapse of the other lung. An important feature of these endobronchial tubes is a narrow bronchial cuff and a relatively short distance from the proximal edge of that cuff to the distal tip of the tube. Hence, there is a lesser chance of bronchial cuff obstructing the upper lobe bronchus and margin of safety is much larger as compared to standard endotracheal tubes.^[2]

Chhabria *et al.* used microcuff endotracheal tube for lung isolation in a 5-month-old infant and 5-year-old child for thoracoscopic excision of congenital bronchogenic cyst.^[3] The smallest size Kimberly–Clark microcuff endotracheal tube is internal diameter 3 mm which could be used in present case of a 2-month-old infant, but it was not available. The outer diameter of microcuff endotracheal tube is 0.1–0.2 mm larger than comparable conventional single lumen endotracheal tube.^[3]

Marraro bilumen tubes are not widely available. It is a DLT for neonates and small children up to 2 or 3 years of age. It consists of two uncuffed tubes that are molded together so as to function like conventional DLTs.^[4]

The smallest Univent tube is 3.5 mm internal diameter and used for children >6 years of age. The smallest Arndt pediatric endobronchial blocker is 5 Fr which may be suitable for children more than 2 years of age as it requires at least a 4.5 mm internal diameter endotracheal tube. Conventionally, the blocker is inserted through the endotracheal tube and positioned in the desired bronchus. This limitation can be managed with insertion of 5 Fr Arndt endobronchial blocker through an extraluminal technique rather than its intraluminal conventional placement.^[5]

In our patient, intraoperatively, there were frequent episodes of bradycardia and desaturation which might be due to vagal stretching and manipulation in a smaller thorax leading to compression of tracheobronchial tree. Surgeons were immediately requested to stop every time which resulted in improvement of heart rate and saturation. Femoral artery was cannulated for beat to beat monitoring of blood pressure. Analgesia is very important in these patients with thoracotomy. The ability to cough and breath is decreased due to pain and secretions may lead to atelectasis and pneumonia. Intercostal nerve block was given by the surgeon under direct vision before skin closure in addition to fentanyl.

Conclusion

A thorough preoperative evaluation is crucial to plan for definitive intra- and post-operative management. Constant communication with surgeons results in better outcome.

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Conflicts of interest

There are no conflicts of interest.

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