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**Anaesthetic management in infants with thoracic and thoraco-abdominal duplication cysts**

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**ABSTRACT**

Foregut duplication cyst are rare mediastinal masses that can occur in children. Though asymptomatic clinically, it can lead to disastrous complications after induction of general anaesthesia, like compression of airway which cannot be relieved even after endotracheal intubation. We here-by report anesthetic management of two infants who were operated in our hospital for excision of duplication cyst.

**Keywords:** duplication cyst, obstructed airway, anesthetic management, complications.

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## INTRODUCTION

Foregut duplication cysts (DC) are rare congenital anomalies located mostly in the posterior mediastinum. Mediastinal masses (MM) carry extreme significance to the anesthesiologist due to complications arising secondary to compression of surrounding vital structures. Pain management in an infant undergoing thoracotomy is also an essential issue to be dealt for an uneventful recovery.

We here-by report two cases of infants, one of them underwent thoracotomy for excision of a large thoracic DC and the other had a simultaneous thoracotomy plus laparotomy for excision of thoracic and abdominal DC in our hospital.

### Case 1:

A 4-month-old female weighing 5 kilograms was diagnosed to have DC of thorax and abdomen in the antenatal period. There were no obvious signs of respiratory distress at birth. The baby was evaluated thoroughly and was scheduled for resection of both cysts. Preoperative computerized tomography (CT) scan was done to rule out compression of airways and major vessels.

A thorough pre-anesthetic evaluation was done, parents of child denied compression symptoms in the history. On the day of surgery, a peripheral 22G intravenous cannula was secured and was pre-medicated with inj. atropine 0.2mg/kg. All the emergency drugs and equipment's required for managing an obstructed airway were kept ready and in presence of operating surgeon, General anesthesia (GA) was induced slowly with incremental doses of Propofol 1.5mg/kg. After confirmation of successful trial of ventilation, 0.5mg/kg of Atracurium muscle relaxant was given and airway was secured by using 4.0 size endotracheal tube.

Child was ventilated with pressure control mode and adequate depth of anesthesia was maintained with a mixture of N<sub>2</sub>O, O<sub>2</sub> and sevoflurane 1%. At the level of T11-T12, epidural space was identified by using 19G Tuohy needle and epidural catheter was inserted for providing analgesia. Intra-operatively 0.25% of Bupivacaine was given at dose of 0.3ml/kg and half of the loading dose was repeated every 90 minutes

Right posterolateral thoracotomy was done via the 6th Intercostal space which revealed cyst arising from the right lateral wall. Meticulous dissection was done and the cyst was excised. Baby was then turned supine, re-draped and a transverse supra-umbilical incision abdominal incision was given, a

very large thin-walled 10X6 cms cyst densely adherent to the retroperitoneum was noted. Cyst could be excised completely after tedious dissection. Surgery lasted 5 hours with minimal blood loss. Baby was extubated in the operating room after regaining airway reflexes and shifted to Paediatric Surgical intensive care (PSICU). A continuous infusion of 0.0625% of bupivacaine and fentanyl 1mic/ml was given through epidural catheter for analgesia for 72 hours postoperatively. Baby had an uneventful recovery and was discharged on 8th post-operative day (POD)

### Case 2:

An 8-month-old male weighing 8 kilograms with history of recurrent respiratory tract infections, was diagnosed to have foregut DC in the thorax and was scheduled for resection. As there was no symptom-free period baby was scheduled for resection when the symptoms were minimal. Similar protocols for anesthesia, airway management and analgesia were followed. Right postero-lateral thoracotomy was done and large thick walled cyst of size 8X8 cms was found arising from the lateral wall of the esophagus, densely adherent to the posterior chest wall and compressing the right lung. Even after maintaining adequate depth of anesthesia, End-tidal-CO<sub>2</sub> (ETCO<sub>2</sub>) continued to be high. The flow rates and respiratory rates were adjusted to maintain ETCO<sub>2</sub> levels around 60-70 mm with need for hand-ventilation intermittently to lower the ETCO<sub>2</sub>. Cyst was excised completely with insignificant blood loss. Baby was extubated in operating room after ensuring a normal ABG and was shifted to PSICU. Baby had uneventful postoperative course and was discharged on 10th POD.

## DISCUSSION

DC are classified in to bronchogenic, esophageal and neuro-enteric cysts. <sup>[1]</sup> Foregut DC constitute 6-15% of MM. <sup>[2]</sup> Many children may also have associated vertebral anomalies. <sup>[3]</sup> Incidence of serious life-threatening respiratory and cardiovascular events during GA in paediatric population is approximately 7-20% peri-operative period. <sup>[4]</sup>

Conventional pulmonary function test cannot be done in infants, so we have to depend largely on history and radiological findings. Subtle symptoms such as cough, stridor, dyspnea, orthopnea, postural dyspnea, or cyanosis should warn about the possibility of compression. Nevertheless, anesthesiologists should always be ready for any emergency even in asymptomatic infants. There are numerous reports of sudden refractory cardio-respiratory collapse on induction of GA even in

asymptomatic patients. In case of any airway catastrophe, other options like changing patient position, emergency cyst de-bulking may be needed. [5]

GA poses an increased risk of airway obstruction leading to irreversible cardiorespiratory collapse. [6] Spontaneous ventilation preserves diaphragmatic movements in caudal direction, maintaining a normal pressure gradients, thus minimizing the airway collapsibility. Hence preserving spontaneous ventilation during induction of anesthesia is an essential strategy. For this ketamine has been used by some, [7] but we found that Propofol in incremental doses along with sevoflurane serves the same purpose.

We concur to both the recommendations of Datt et al [8]: a) avoidance of sedative pre-medications, b) availability of all devices for managing an obstructed airway and presence of operating surgeon during induction of anesthesia.

Though there is theoretical risk of cyst expansion using nitrous oxide and controlled ventilation during induction, Birmingham et al in a review of 24 patients with bronchogenic cysts did not encounter any problem. [9] We also took care to keep airway pressures below 20 cms as

recommended by Bharti et al to prevent cyst expansion. [10]

Providing adequate analgesia is also challenging task in infants. Thoracotomy pain may limit effective air exchange in already compromised lung from atelectasis and handling during surgery. Early extubation and preventing pulmonary complications is possible only with adequate analgesia. We provided adequate analgesia via thoracic epidural infusion of bupivacaine and fentanyl which helped in immediate postoperative extubation and uneventful recovery.

## CONCLUSION

The need for detailed history, clinical examination, anticipation of dreadful complications, and equipping oneself to meet these requirements is paramount in children scheduled for DC excision under GA. Provision of adequate analgesia plays a key role in early recovery.

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