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ANAESTHETIC CHALLENGES IN A CASE OF CONGENITAL CYSTIC ADENOMATOID MALFORMATION

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INTRODUCTION:

Congenital pulmonary airway malformation (CPAM) - previously known as congenital cystic adenomatoid malformation (CCAM) - is a rare developmental malformation of the lower respiratory tract. It is accepted that abnormal airway patterning and branching during lung morphogenesis results in the appearance of lung cysts.[1] It is composed of aberrant lung tissue that keeps expanding and resembles bronchioles physically, but lacks cartilage, alveoli, and bronchial glands. These masses may become overdistended leading to respiratory distress due to air trapping mechanism. Treatment of symptomatic lesion is usually surgical resection of the lesion or affected lobe.

CASE REPORT:

A 2 year old female child, weighing 11kg came with complaints of recurrent cough and cold since three months , not resolving with medications. Birth history was Full term normal vaginal delivery and was uneventful. General examination & airway examination was normal. On auscultation, air entry was reduced in the left lower lobe. HRCT thorax showed left lower lobe mass like consolidation measuring 48x64x57mm with necrotic areas. Left sided diaphragm was raised with mild mediastinal shift to right and 2D Echo showed normal study.

On the day of surgery, consent was checked and explained, NBM status was confirmed and 22G IV cath was taken pre operatively and ASA standard monitors were attached. Patient was taken inside the OT and preoxygenation was given using mask and Jackson Rees circuit. Premedication was given Inj. Glycopyrrolate (0.004mg/kg) and Inj Midazolam (0.02mg/kg) iv, and induction was done with Inj. Fentanyl (2microgram/kg) and Inj Propofol (2mg/kg) iv. Long-acting muscle relaxant (Inj. Atracurium 0.05mg/kg) was administered, and intubated orally with size 5 uncuffed Endotracheal tube and was fixed at 13cm; Air entry both sides was confirmed by

auscultation and capnography and tube was fixed. Patient was maintained on O2:AIR (50:50) with inhalational agent Sevoflurane at 1.5 and ventilated with Jackson Rees circuit on manual ventilation. Under all aseptic precautions, with patient in left lateral position, thoracic epidural was introduced using 19 G Touhy's epidural needle at T9-T10 level, fixed at 5cm and injection Ropivacaine 0.25% infusion was started at 2ml/hr. Intraoperative position was right lateral and hence, adequate padding was given on the sites of nerve compression.

While handling the mass, secretions were observed in the endotracheal tube and oxygen saturation started dropping till 85%, Intermittent Endotracheal tube suctioning was done to drain the blood stained secretions/spillage from the operative site and patient was ventilated with low tidal volume and high respiratory rate after which saturation came to normal. The surgery took 2 hours. After excision of the cystic mass, Intercostal drainage (ICD) tube was inserted and leak was checked with Valsalva manoeuvre. Intraoperative analgesia was maintained with epidural infusion of Inj. Ropivacaine 0.25%. ABG was taken from the right radial artery which showed: pH- 7.36, pCO2- 37, pO2- 108, HCO3- 22.5, Lactate-1.0, Sat-95%. At the end of surgery, after checking the spontaneous respiratory efforts by the patient, Inj. Neostigmine (0.05mg/kg) and Inj. Glycopyrrolate(0.008mg/kg) was given iv as reversal agent and patient was extubated uneventfully along with gentle suctioning of ETT and orally.

The patient was shifted to Paediatric Intensive care unit (PICU) post operatively in view of observation for two days with oxygen supplementation 2litres. In PICU, blood transfusion was given 100ml over 4hrs and epidural infusion of Inj. Ropivacaine 0.125% at 2ml/hr for pain relief and comfort of breathing. Rest of the hospital stay was uneventful, and the child was discharged on Post operative day 6.

DISCUSSION:

CPAM has an incidence of 1/20,000–1/30,000 live births. It accounts for 25% of all congenital lung anomalies, second only to congenital lung emphysema.[2] In Congenital lobar emphysema, inhalational induction is the anaesthetic technique of choice. N_2O is avoided during this surgery as it is known to diffuse rapidly in a closed cavity leading to further compression and mediastinal shift. Anaesthesia was induced in our child with sevoflurane in 100% O_2 without muscle relaxant.[3] Avoidance of PPV is advocated by several authors until thoracotomy[4]. In CPAM, we induce the patient and give muscle relaxant before intubation and Intermittent Positive Pressure ventilation is given as and when required.

Lung isolation in children can be achieved by endobronchial intubation using a single or double lumen tube, bronchial occlusion using a bronchial blocker such as a pulmonary artery catheter or Fogarty catheter or purpose built bronchial blocker tube such as a Univent tube[5]. In our case, there was no such indication for single lung ventilation. There are chances of sudden hemodynamic collapse and hypoxia at the time of induction in cases related to mass in the lungs. The lateral position is known to cause respiratory effects and a decrease in FRC under anaesthesia. Furthermore, there may be dislodgement of the ETT due to the positioning.[6] CCAM may contain fluid varying from clear to purulent and there is a risk of spillage.[7] This can be

reduced by giving minimal positive ventilation with low Tidal volume and high Respiratory rate before isolating the non-operative lung and suctioning at routine intervals in the intraoperative period. It is important to suction the ETT in the lateral position, before the patient is made supine, to prevent cross lung contamination at the end of surgery. There are chances of cross lung contamination in which case we would have considered changing the ET tube with a paediatric bougie. During manipulation of the mass, patient was ventilated with low TV and high RR with apneic ventilation which was then corrected by suctioning and PEEP ventilation. Thoracic epidural catheter placement was performed after induction, to provide intraoperative pain relief, allow for early extubation, and reduce anesthetic requirements and for postoperative pain relief for ease of breathing.

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