

Anaesthetic management of posterior mediastinal mass in a child. A case report

N. B. Sonawane, S. Gaiwal

Department of Anaesthesia Lilavati Hospital and Research Centre, Mumbai, India

Corresponding author: N. B. Sonawane, Department of Anaesthesia Lilavati Hospital and Research Centre, Mumbai, India. Email: sonawanenilesh805@gmail.com

Key points

Mediastinal masses pose unique challenges for anaesthesiologist throughout the peri operative period. Large mediastinal masses can cause compression of heart, lungs, large vessels and spinal cord leading to cardio respiratory failure. Selection of type of endotracheal tube for one lung ventilation in paediatric patients is difficult as choice is very limited. Post-operative period is prone to complications like airway collapse, herniation, pulmonary torsion, major haemorrhage and atelectasis. A multidisciplinary approach involving anaesthesiologist, paediatric, thoracic, neurosurgeon and paediatric intensivist leads to favourable outcome.

Abstract

Mediastinal masses pose unique challenges for anaesthesiologist throughout the peri operative period. Depending on the size, location, pathology and associated thoracic structures involved patient may complain of specific symptoms or be asymptomatic.

Keywords: Difficult airway, one lung ventilation, Posterior mediastinal mass.

Introduction

Airway management in children with posterior mediastinal mass poses challenge to anaesthesiologists including risk of airway obstruction during surgery and immediate postoperative period. Therefore vigilance must be maintained throughout the perioperative period. Ganglioneuroma is rare and benign tumour of autonomic nerves arising from neural crest which are undifferentiated cells of sympathetic nervous system.¹ We report a case of large posterior mediastinal ganglioneuroma in a 3 years old female child after taking informed consent from her parents.

Case report

A 3 years old 12 kg child sustained left forearm fracture. During preoperative assessment chest radiograph (Fig 1) revealed large mediastinal mass and was referred to our institute for further evaluation. On enquiry parents gave history of multiple episodes of syncope with cyanosis on exertion and recurrent cough and cold. No history of sensory-motor impairment. On auscultation air entry was decreased on right side. Other systemic examination and haematological investigations were within normal limits. Computed tomography (Fig 2) showed 11 x 11 x 10 cm lobulated homogenous mass in right posterior mediastinum and mild right pleural effusion. Magnetic resonance imaging revealed the mass extending in spinal canal from right neural foramina T4-9. Tracheal and esophageal anterolateral displacement was evident. The paediatric, thoracic and neuro surgeons planned excision of mass in left lateral position with right thoracotomy. Anaesthesia plan was one lung ventilation with left endobroncheal intubation. We avoided epidural due to extension of tumour in spinal canal.

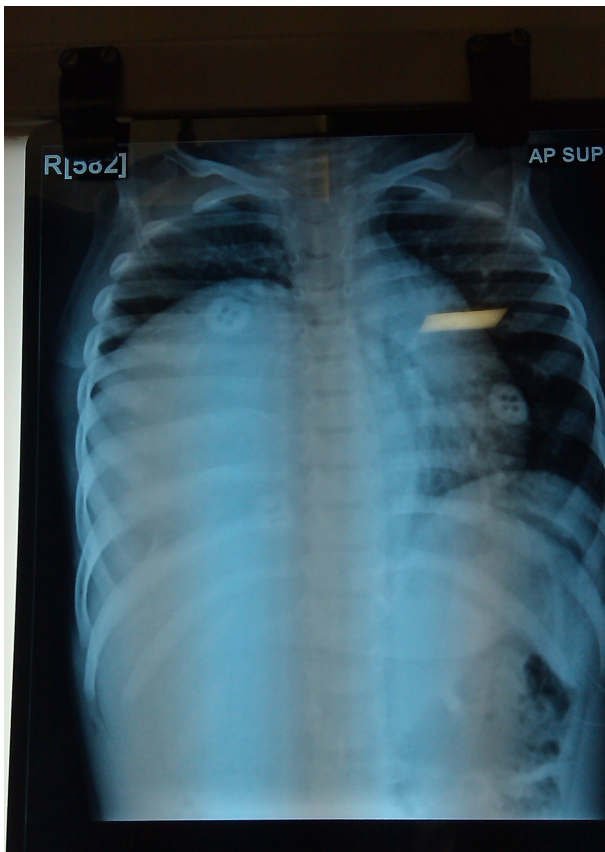


Fig. 1. Chest X-ray of the child



Fig. 2. CT scan cross sectional view

Using 22G intravenous (IV) line in situ child was pre-medicated with Fentanyl 25 mcg and Midazolam 600 mcg. Standard monitors were attached. Paediatric airway cart and 3.7 mm fiberoptic bronchoscope kept ready. Child was preoxygenated with 100% oxygen. Anaesthesia was induced with IV Propofol and Sevoflurane. After confirmation of mask ventilation Atracurium was given. The child was intubated with Kimberly Clark tube 4.5 mm till cuff was just beyond cords. Tube was fi-

xed after noting marking at right angle of mouth - 15 cm. ET CO_2 graph confirmed proper placement of endotracheal tube. Anaesthesia maintained with O_2 - Air (FiO_2 0.5) + Sevoflurane + intermittent atracurium boluses. Right radial artery was cannulated using 22G arteriofix cannula for blood pressure monitoring. Right internal jugular vein was cannulated with 5 Fr triple lumen catheter under ultrasound guidance. Single lung ventilation was achieved by advancing endotracheal tube (ETT) in left bronchus under fiberoptic guidance, making sure that upper lobe bronchial opening was patent. Tube was fixed at 17 cm at right angle of mouth and isolated left lung ventilation was confirmed by auscultation. We used pressure controlled mode, respiratory rate 22 per minute and positive end expiratory pressure 6 cm of H_2O . Intraoperative blood pressure was maintained between 50th - 90th percentile (91-104 mmHg systolic and 52-66 mmHg diastolic) for 3 years age. Intraoperative frozen section report showed maturing ganglioneuroma. Intra operatively during dissection there were frequent variations in BP due to compression of aorta. Surgeons were warned time to time to release pressure. Intraoperative arterial blood gas showed minimal hypercapnea (PCO_2 52) with PH 7.32. Once tumour was debulked and shaved off leaving posterolateral attachment and neuro surgeons took over to excise transforaminal extension, ETT was withdrawn by 2cm to achieve two lung ventilation. Duration of one lung ventilation was 4 hours involving intermittent suctioning of left lung through ETT and recruitment manoeuvre to maintain $\text{SpO}_2 > 94\%$. Intra operatively analgesia was maintained with IV morphine, total 3 mg, IV paracetamol 250 mg. Fluid losses and 250 ml blood loss intra-operatively was replaced by 330 ml crystalloids, 230 ml colloids and 160 ml packed red blood cell. Total urine output was 150 ml for total surgical period of 8 hours. Infiltration of 0.25 % Bupivacaine was given during closure and diclofenac suppository 12.5 mg per rectally for post-operative analgesia. Post operative ABG was within normal limits. Patient was electively ventila-

ted in paediatric intensive care unit (PICU). Child was extubated after 34 hours and shifted to ward on day 3. Right intercostal drain was removed on post-operative day 6.

Discussion and conclusion

Mediastinal masses are known to be a nightmare for anaesthesiologists. Neurogenic tumours are most common posterior mediastinal masses in paediatric population. Incidence of paraganglioma in children is rare and spinal involvement is not known.² Risk of cardio-respiratory failure is more with large mediastinal masses as they can cause compression of heart, lungs, large vessels and spinal cord. History of our child was suggestive of cardio-respiratory compromise. We didn't do pulmonary function testing as child was too small to perform the test. Patients who have airway compromise, flow volume loops on spirometry have found poor correlation with degree of airway obstruction. Lalwani et al described airway obstruction in immediate post-operative period in their patient with large posterior mediastinal mass developing stridor and respiratory distress after extubation. Bechard et al reported incidence of intraoperative cardiorespiratory complications 3.8% and postoperative respiratory complications 10.5%. Therefore to be cautious we shifted our patient electively on ventilator to PICU.

Children are more prone to anaesthesia related deaths in such cases³ because cartilaginous structure of the airway is more compressible in children.

Providing one lung ventilation has unique challenges in paediatric patients. Isolation of lung with double lumen Marraro's tube is only for infants. These tubes are uncuffed resulting in leak and inflation of opposite lung. The smallest available Univent tube is for child above 6 years. Smallest ETT through which balloon tipped bronchial blocker can be passed is 5.0 mm^(4,5,6). Our patient being 3 years of age we had no option but to do selective endobroncheal intubation. We used Kimberly Clark size 4.5 mm microcuff ETT as the distance between tip of tube to distal cuff is short helping in

maintaining patency of upper lobe bronchus. These tubes have a short cuff with a smooth, thin membrane which allows lower inflation pressure to seal trachea⁷. We could reduce duration of one lung ventilation after debulking of tumour by simply withdrawing the tube. Post-operative period is prone to complication like airway collapse, herniation, pulmonary torsion, major haemorrhage and atelectasis. In our patient post-operative period was uneventful due to multidisciplinary approach involving anaesthesiologist, paediatric, thoracic, neurosurgeon and paediatric intensivist.

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