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ANAESTHETIC MANAGEMENT OF A CASE OF CONGENITAL DIAPHRAGMATIC HERNIA

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ABSTRACT Congenital diaphragmatic hernia is a condition resulting from anomalous closure of diaphragm. The defect in the diaphragm leads to protrusion of abdominal viscera into the thorax. It is associated with other conditions like pulmonary hypoplasia, pulmonary hypertension and right to left shunting. Intraoperative management is complicated by these associated anomalies which may lead to hypoxia and hypercarbia and increased mortality. In the following case report, we describe the management of a 6 days old neonate who presented with respiratory distress and inability to feed.

KEYWORDS : Diaphragmatic hernia, congenital, neonate, congenital anomalies

INTRODUCTION

Congenital diaphragmatic hernia is a condition where the diaphragm fails to develop properly leading to the herniation of abdominal organs into thoracic cavity. This leads to the development of abdominal organs in the pleural cavity which impairs growth of ipsilateral lung.[1]It results from the anomalous closure of pericardio peritoneal canal. The incidence of this condition is 1 in 2,500 live births and affects left side 4 to 8 times more than the right .[1-4]

CASE REPORT

A 6 days old preterm female baby weighing 2.3kg, admitted in NICU for the complaints of respiratory distress and not able to feed since birth. The baby was delivered at hospital by vaginal delivery at 36wks of gestation and cried immediately after birth. There was no history of cyanotic spells/ seizures after birth. The mother was a booked case and undergone antenatal check-ups.

On examination, the baby was in respiratory distress with RR (respiratory rate) of 64/min and oxygen saturation of 98% on nasal prongs with FiO2 of 4 L/ min. Systemic examination showed decreased air entry on left side of chest without any added sounds, S1 S2 were normal and abdomen was scaphoid. The blood gas analysis showed pH of 7.33, PaO2 35mmHg, PaCO2 39.5 mmHg and HCO3 20.2. Nasogastric tube was in situ. CXR showed presence of bowel loops on left hemithorax and subnormal lung expansion on left. CECT thorax showed multiple bowel loops in left hemithorax with collapse and consolidation of left lower lobe with partial collapse and consolidation of left upper lobe with evidence of mediastinal and heart shift towards right.

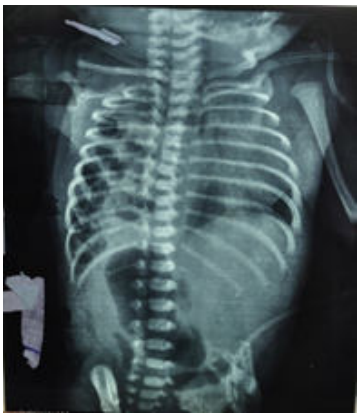

Figure 1: CXR showing herniation of bowel loops in left hemithorax

Anaesthetic management

A written and informed consent for surgery and post op ventilatory support was taken and patient was shifted to OT on nasal prongs with O2 support. All routine monitors including ECG, SpO2 were connected and IV (intravenous) line was secured. Stomach was decompressed by suctioning the nasogastric tube. Baseline readings of HR= 155/min, SpO2=96% on O2 and 80-85% on room air were recorded. Pre-oxygenation with 100% oxygen was done for 3 min. Induction was done with Inj. (injection) glycopyrrolate 0.1 mg IV, Inj. fentanyl 4.5 µg IV and Inj. thiopentone 10mg IV. Anaesthesia was maintained with inhalational Sevofluorane and oxygen and airway was secured with uncuffed ETT of ID 3mm under direct laryngoscopy. Muscle relaxation was achieved using Inj Atracurium 1.5 mg IV following intubation. Patient was maintained on oxygen, sevoflourane and Inj atracurium SOS. The patient was ventilated with JR (Jackson-rees) circuit. Intraoperatively, patient's haemodynamics were stable with HR around140/min and SpO2 99%. The surgery was completed uneventfully and patient was shifted to NICU and was put on ventilatory support on SIMV mode with FiO2 of 60% , PEEP 5cmH_2O and PiP 20-25 cmH_2O.

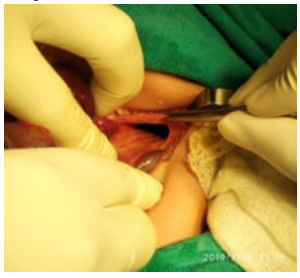

Figure 2: Diaphragmatic defect

Post-surgical CXR was done and showed well expanded bilateral lungs. Baby was kept on ventilatory support for 3 days and was extubated on 4th post op day and was thereafter discharged.

DISCUSSION

CDH is associated with high mortality rate. Survival rate depends upon the associated anomalies and the degree of pulmonary hypoplasia. The prognosis depends upon timely intervention, surgical correction and perioperative management. Associated pulmonary hypoplasia and mediastinal shift posed a challenge in this case. Therefore, avoiding Nitrous oxide and ventilating with low tidal volume along with continuos monitoring of SpO_2 is crucial to prevent hypoxemia. Postoperative ventilation with low tidal volume and keeping low airway pressure is vital in preventing barotrauma.

CONCLUSION

The key to successful management of CDH is early diagnosis, intervention and adopting proper ventiatory strategies. Maintainance of adequate airway pressures and hemodynamic stability is associated with a good outcome. In cases of severe lung disease and pulmonary hypertension, ECMO can be initiated early. Gentle ventilation and maintaining $PaCO_2$ between 50-70mmHg with adequate oxygenation and perfusion are the key to good management.

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