



## A WHEEZING CHILD: RESPIRATORY CAUSE OR NOT? A CONGENITAL DIAPHRAGMATIC HERNIA IN A 6-MONTH-OLD CHILD.

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**ABSTRACT** Children present most commonly with respiratory symptoms like wheezing. There are many conditions, both pulmonary and extra pulmonary, which may cause recurrent wheezing. Delayed presentation of Congenital Diaphragmatic hernia presents similarly and poses a considerable diagnostic challenge. We report a 6-month-old child with congenital diaphragmatic hernia who presented with recurrent respiratory symptoms and localized physical findings and the anaesthetic challenges faced during the case. This case highlights the need to consider alternative diagnoses including CDH in the evaluation of recurrent respiratory symptoms; this is especially true if the presentation is not consistent with asthma or there are asymmetric findings on auscultation.

**KEYWORDS :** Congenital Diaphragmatic hernia, delayed presentation, anaesthetic management

### INTRODUCTION -

Diaphragmatic hernia is a structural defect caused by inadequate fusion of the pleuro-peritoneal membrane which forms the diaphragm, allowing the peritoneal pleura to protrude into the pleural cavity. Congenital diaphragmatic hernia (CDH) usually presents immediately after birth with respiratory distress. However, if it presents later in life, it can have a varied presentation and is a significant diagnostic challenge. The features may have a perplexing clinical presentation.

### Case Study:

A 6-month-old child (6.7kg) was brought with complains of cough, intermittent fever, inconsolable crying, rapid breathing, and multiple episodes of vomiting for 3 days.

The child had intermittent bouts of cough without diurnal variation. Child was apparently alright before the foresaid period when he developed vomiting and presented with inconsolable cry was admitted to a primary hospital where he received treatment for wheezing and intestinal colic.

Increased work of breathing and worsening of distress was noted. The patient was transferred to our higher centre. Repeat Chest X-ray and CT scan revealed left sided diaphragmatic hernia with herniation of small bowel loops through the left thoracic cavity. The child underwent laparoscopic surgical repair of the CDH without any complications.

### Anesthesia Management- Preoperative management-

All routine Investigations were within normal limits .Abg was suggestive of respiratory alkalosis. 2D echocardiogram was within normal limits .

Vitals were assessed periodically. The patient had a preductal (right hand )and post ductal (foot)spo2 monitoring . Patient was optimised with antibiotics and nebulization.

### Intra operative management:

An Informed written consent , adequate blood reservation and adequate nil per oral status was confirmed. Inside the theatre all the standard ASA monitors were attached and the baseline vitals were noted.

( Spo2 -preductal and post ductal , Blood pressure, ECG, Temperature , Etc2). All the precautions to prevent hypothermia were taken. After adequate pre oxygenation and pre medication with IV Glcopyrrolate 4mcg/kg and IV Fentanyl 2mcg/kg, patient was induced with Propofol 2mg/kg and Sevoflurane 0.2-2%. Microcuffed endotracheal tube 3.5 ID was used to intubate the patient . Air entry was checked to confirm the tube position. The patient was given a right lateral decubitus position. A precordial stethoscope was placed for identifying

pneumothorax if any .Air entry was rechecked . Anaesthesia maintenance was provided with intermittent doses of IV Atracurium and Sevoflurane 0.2to2% along with equal concentrations of oxygen and air.

Fluid management was done judiciously. Fluid-DRL was given at calculated doses. Analgesia was provided in the form of IV Fentanyl bolus dose of 6mcg, IV Paracetamol 15mg/kg , infiltration of local anaesthetics at incision sites.

Surgery (Laparoscopic CDH repair) duration was three hours. Intra-operative blood loss was minimal. Surgery was uneventful. The patient was reversed with IV Glycopyrrolate 8mcg/kg and IV Neostigmine 0.05mg/kg .The patient was given 100% O2 and was shifted for further monitoring to PICU.

### Post op period:

Air entry significantly improved on the left side and the chest xray taken on Post operative day 4 showed good expansion of the left lung.

### DISCUSSION AND CONCLUSION:

#### Anaesthetic Concerns Are:

#### • Airway

Differences in airway anatomy make the potential for technical airway difficulties greater in infants and children as compared to adults. The differences i.e. large head and tongue , mobile epiglottis and anterior position of larynx will make the tracheal intubation of patient easier if the head is placed in a neutral or slightly flexed position rather than a hyperflexed position. However a difficult airway should always be anticipated and prepared for.

#### • Positioning

A lateral position was given to the patient in order to facilitate the surgical procedure. Careful positioning of the patient is paramount to reduce adverse events. Padding on pressure points from bony prominences is needed to minimise skin breakdown . Peripheral neuropathies , usually occur due to stretch or compression injury due to positioning.

#### • Ventilation

Inproper ventilatory support can result into Hypercarbia and ultimately Respiratory Acidosis. Paco2 reflects the severity of lung pathology and therefore survival. Inability to reduce Pac02 indicates poor prognosis The goals of ventilation are to optimise pH and pulmonary blood flow with minimum barotrauma.

#### • Temperature control

Paediatric patients are vulnerable to hypothermia because of both large body surface area to weight ratio and the limited ability to cope with cold stress. The problem gets compounded by child Operating room temperature , wound exploration, IV fluids administration, dry

anaesthesia gases and direct effect of anaesthetics on temperature regulation.

**Table 1: Measures to reduce hypothermia.**

Heat loss by	Can be reduced or compensated by
Conduction	Placing the child on a warm mattress and warming the OR
Convection	Covering the patient with blankets Placing a head drape
Radiation	Double shelled isolette transport
Evaporation	Humidification of inspired gases Making use of a plastic wrap to decrease water loss through the skin

Hypothermia may be associated with delayed awakening and extubation from anaesthesia. It may also cause cardiac irritability, respiratory depression, increased pulmonary vascular resistance and altered drug response.

**• Hypoxemia**

Hypoxemia due to lung compression , primary pulmonary hypoplasia, pulmonary hypertension, and high pressure induced iatrogenic contralateral pneumothorax is an important factor to be concerned about.

Severe cases of congenital diaphragmatic hernia usually present in the first minutes to hours of life. Less severe onset present within 24 hours after birth. The classic triad of CDH consists of cyanosis , dyspnoea and apparent dextrocardia.

But if any of such case presents late in life there may be a varied presentaion . This case was asymptomatic till 6months of age and then presented with an array of symptoms. The mother had all normal ANC scans timely done with an uneventful birth history of the patient. All other routine investigations done for the patient were within normal limits.

As anesthesiologist challenges and concerns in the management of this case were tackled with a multidisciplinary approach as these are different from neonatal CDH.

The clinical presentation in such cases could vary from being asymptomatic to recurrent pulmonary infections to respiratory distress , non specific gastrointestinal symptoms (epigastric pain, vomiting etc) to intestinal obstruction.

Cdh can be associated with major anomalies specially cardiac and chromosomal (trisomy 21 and deletions)

The key intaroperative focus- Haemodynamic stability , avoiding pulmonary barotrauma through ventilator optimization. Laproscopic approach gave all the advantages of a minimally invasive surgery.

Keeping CDH as a differential diagnosis in such clinical presentation should be considered since early diagnosis and proper surgical treatment shows excellent prognosis. Literature describes morbidity and mortality is linked to non diagnosed patients.

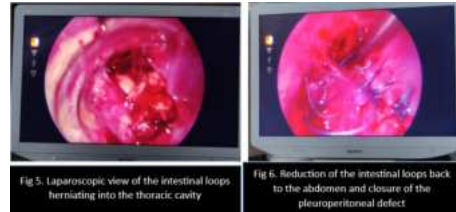


Fig 5. Laparoscopic view of the intestinal loops herniating into the thoracic cavity

Fig 6. Reduction of the intestinal loops back to the abdomen and closure of the pleuropertitoneal defect

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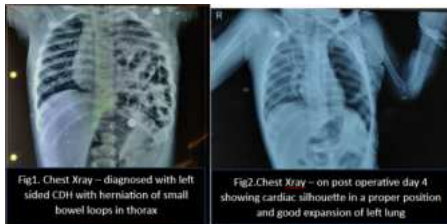


Fig1. Chest Xray – diagnosed with left sided CDH with herniation of small bowel loops in thorax

Fig2. Chest Xray – on post operative day 4 showing cardiac silhouette in a proper position and good expansion of left lung



Fig3&4. Patient position given intra op. – lateral position with proper draping and a precordial stethoscope