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Case Report

A Case Report on Right-Sided Congenital Diaphragmatic Hernia

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ABSTRACT

Background: Congenital Diaphragmatic Hernia (CDH) is a diaphragm abnormality it permits stomach contents to protrude into the thoracic cavity, posing a substantial risk for pulmonary and cardiac problems in newborns. The pathophysiology of congenital diaphragmatic hernia is a combination of lung hypoplasia and immaturity associated with Persistent Pulmonary Hypertension (PPHN) in newborns and cardiac dysfunction. **Case Presentation:** A 1-year-old male patient was admitted to the hospital with chief complaints of excessive crying, breathlessness, and fever for one month. On examination, we observed decreased air entry on the right side in the inframammary area, and no air entry in the infra-axillary area. The Ultrasonography (USG) of the chest showed bowel loops along with mesentery. Surgical correction is required for a diaphragmatic hernia. Right thoracotomy, laparotomy, and repair of hernia were done **Conclusion:** The Prior diagnosis during the pre-natal period induces a better prognosis.

Keywords: Herniation, Pulmonary hypertension, Bowel loops, Right thoracotomy, Lung hypoplasia.

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INTRODUCTION

Congenital Diaphragmatic Hernia is a diaphragm abnormality it permits stomach contents to protrude into the thoracic cavity, posing a substantial risk for pulmonary and cardiac problems in newborns. The defect may range from a small aperture in the posterior muscle rim to the complete absence of the diaphragm.[1] This causes an adverse impact on the normal development of the fetal cardiac and pulmonary systems. Thus, it is associated with substantial morbidity and mortality.[2] Major morbidity and mortality arise due to pulmonary hypertension and pulmonary hypoplasia.[3] Usually, the diaphragm's defect is not a hole but rather a thinning or partial muscularization, a condition known as a sac-type congenital diaphragmatic hernia.[4]

Over 90% of patients will be diagnosed either antenatal through a Targeted Imaging for Fetal Anomalies (TIFFA) scan or will present with respiratory distress in the first few hours after birth. About 5 to 30 percent of diaphragmatic hernias develop after birth. The incidence of congenital diaphragmatic hernia ranges from approximately <1 to 5 in 10,000 births. Lung to-Thorax transverse area ratio (L/T ratio) and the Lung area to Head circumference (LHR) have been used as a parameter to assess pulmonary hypoplasia. The first 6 hr of life of a newborn are critical for predicting the outcome of the patient. It is theorized that if in the first 6 hr of birth, the patient does not have any symptoms then there is a reasonable lung function and therefore is likely to have higher survival rates. Conversely, if the patient has respiratory has a higher propensity for having pulmonary hypoplasia and thus higher mortality rates.[5]

The etiology and pathogenesis of congenital diaphragmatic hernia are not well understood, although the characteristics of CDH patients have been reported since the seventeenth century. Although the congenital diaphragmatic hernia varies greatly from patient to patient, it is typically accompanied by respiratory distress. Only a very few patients (1%) are asymptomatic, in these patients CDH is often diagnosed coincidentally by radiographic investigations at a variable point in time, sometimes even during puberty.[6]

Classification of CDH is based on the location of the diaphragmatic hernias. 70-75% of Hernias are posterior-lateral

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Hernias which are also known as Bochdalek hernias. 23-28% are Anterior defects or Morgagni Hernias, while 2-7% are rare central Hernias. In Bochdalek Hernias, 85% occur on the left side, while 13% occur on the right side which is less frequent.[7]

In one case series, 30% of patients had persistent respiratory and Gastrointestinal (GI) symptoms such as progressive dyspnoea, wheezing, recurrent respiratory infections, fussiness, poor development, intermittent abdominal pain, and vomiting.[8]

The diagnosis is based on physical signs and symptoms. The position of the herniated viscera is visible on an abdominal and thoracic X-ray. Blood gases and PH status show the effectiveness of gas exchange and other derived indexes refine this assessment. Associated malformations can be known by using the USG chest.[9]

CASE SUMMARY

A 1-year male patient was admitted to the pediatric department in Sri Ramachandra Children's and Dental Hospital with complaints of excessive crying, breathlessness, and fever for 1 month. On admitting, the child was sick, and dull, decreased air entry on the right side and crepitations were heard. The patient weighed 7.3 kg. Laboratory investigations were performed. His hemoglobin, Packed Cell Volume, Red blood cells, Neutrophils levels, and Platelets were decreased, and White Blood cells, lymphocytes, Eosinophils, and Erythrocyte Sedimentation Rate levels were increased (Table 1 and Table 2). The USG of the chest showed bowel loops along with mesentery. The echogenic right dome of the diaphragm is not clearly visualized, likely a diaphragmatic hernia. On examination, we observed decreased air entry on the right side in the inframammary area and no air entry in the infra-axillary area.

Based on the clinical and radiographic evidence of Ultrasonography of the chest, the patient was diagnosed with a "Right Diaphragmatic Hernia".

DISCUSSION

Congenital diaphragmatic hernia is a herniation of the abdominal content through a defect or hypoplasia of the diaphragm and is associated with varying degrees of Pulmonary Hypoplasia. The malformation commonly manifests as a hole or discontinuity. CDHs may be considered 'isolated cases' (i.e., the only malformation is the diaphragmatic hernia) or 'nonisolated cases' (i.e., associated with other anomalies).

Persistent pulmonary hypertension was the major cause of death occurring in 76.5%, severe cardiac malformations in 14.7%, multiorgan failure, pulmonary hemorrhage, and sepsis each in 2.9% respectively. Based on previous studies vitamin A deficiency in pregnant rats induced the development of a diaphragmatic hernia, and with the administration of Vitamin A, the incidence of the defect was reduced from 31% in non-treated to 0% in the treated cohort if treatment was administered very early in pregnancy (10 to 11th day of gestation).

Currently, the initial approach to managing CDH is focused on restoring optimal respiratory function prior to surgical repair.

A one-year-old male patient was admitted with chief complaints of excessive crying, fever, and breathlessness for 1 month. Hematological and renal function tests revealed that investigating hemoglobin, Packed Cell Volume, Red blood cells, Neutrophils

Table 1: Haematological Parameters.

Parameters	Day 1	Day 3	Day 5	Day 9
Hb (gm%)	9.4	8.9	12.7	12.4
PCV (%)	27	25		
RBC (M/cu.mm)	4.4			
WBC (cells/cu.mm)	13.200	12.300		15.700
Neutrophils (%)	38	35	45	33
Lymphocytes (%)	58	62	52	63
Eosinophils (%)	4	3	3	4
Platelets (L/cu.mm)	1.35.000			
ESR (mm/hr)	18			
C-Reactive protein (mg/L)	5.2			

Table 2: Renal Function Tests.

Parameters	Day 1	Day 3	Day 5	Day 9
Creatinine (mg/dL)	0.5	0.5		0.5
Sodium (mmol/L)	136	132		130
Potassium (mmol/L)		3.8		

levels, and Platelets were decreased, White Blood cells, lymphocytes, Eosinophils, Erythrocyte Sedimentation Rate levels were increased (Table 1 and Table 2). His USG of the chest showed bowel loops along with mesentery. The echogenic right dome of the diaphragm is not clearly visualized, so it can be likely a Diaphragmatic Hernia.

Surgical correction is required for a diaphragmatic hernia. So, the patient was kept under observation prior to surgery. The day before surgery, the patient was prescribed IV antibiotics like 80mg of Azithromycin, 50 mg of Amikacin, and 0.8 mL of Ranitidine, and IV fluids were also given. The patient was ordered nil by Mouth the day before surgery, on the day of surgery, and the day after surgery.

Right thoracotomy, laparotomy, and repair of hernia were done. After the surgery, the patient was shifted to the Pediatric Intensive Care Unit (PICU) and was kept under observation for 8 days. Blood transfusion was done during the surgery and after the surgery. The antibiotics before the surgery were continued even after the surgery 5 days. Postoperatively Paracetamol rectal suppository was given; 100mL of Inj. Astymin was started on the second day and was given for 4 days. Syrup Azithromycin was started after the 5th day and was given for the following 3 days.

At the time of discharge, the patient was stable with normal vitals, taking feeds, and bowel and bladder habits were normal. The wound was healed, and sutures were removed on the 8th Post-OP day. Discharge medication was given, 8 drops of Zincovit twice a day. The patient was advised to take only a soft diet. The patient was advised to join the hospital immediately if they have any symptoms like fever or breathing difficulty.

CONCLUSION

The diagnosis in the pre-natal period induces a better prognosis, i.e., prenatal assessment of Lung-to-Head Ratio (LHR) and position of the liver by ultrasound is used to diagnose and predict outcomes. An early diagnosis with an increased understanding of this disease is a crucial factor for a timely approach to managing critically ill infants and offers the potential for improved outcomes and substantial reductions in morbidity.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ABBREVIATIONS

CDH: Congenital diaphragmatic hernia; **USG:** Ultrasonography; **Hb:** Haemoglobin; **PCV:** Packed cell volume; **RBC:** Red blood cell; **WBC:** White blood cell; **IV:** Intravenous; **ESR:** Erythrocyte sedimentation rate.

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