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Case Report

Diaphragmatic Eventration in A Neonate with Acute Respiratory Distress: A Rare Association

Muhammad Mudasir Saleem

Department of Peads Surgery, Combined Military Hospital, Lahore/National University of Medical Sciences (NUMS) Pakistan

ABSTRACT

Respiratory distress in neonates is mainly secondary to medical causes. Diaphragmatic eventration in neonate leading to respiratory distress is rarely reported in literature. Timely diagnosis and intervention to correct the anomaly has promising outcomes. We present a two days old neonate who presented to pediatric surgery emergency in Combined Military Hospital Lahore, Pakistan in November 2023 with progressive respiratory distress following birth and was diagnosed as having isolated left sided diaphragmatic eventration and his distress settled following surgery.

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INTRODUCTION

Respiratory distress is the leading cause of neonatal mortality in developing countries.[1] Up to 30% of pre-term while 5% of full-term babies experience respiratory distress following birth being multifactorial in origin.[2] Prematurity and low birth weight remain the two most important independent causative factors. Over 90% of cases of neonatal respiratory distress arise from medical causes such as transient tachypnea of newborn, surfactant deficiency and aspiration syndrome.[3] Surgical causes of acute respiratory distress include congenital lung malformation, congenital lobar emphysema, diaphragmatic hernia, pulmonary sequestration. Isolated diaphragmatic eventration is a very rare cause of acute neonatal respiratory distress.

CASE REPORT

A two days old term boy having weight of 2800 grams born by spontaneous vaginal delivery to a primigravida referred to our set up with persistent progressive tachypnea and respiratory distress since birth for evaluation of abnormal chest x-ray. Antenatal history was insignificant. There was no history of birth asphyxia or resuscitation following birth. Child tolerated first feed and passed meconium within 24 hours of birth. Examination revealed tachypneic child with respiratory rate of 78 breaths per minute, maintaining oxygen saturation on room air without any obvious cyanosis but with limited movements of left chest. Auscultation of left chest showed reduced breath sounds with gurgling sounds in lower chest. Chest x-ray performed at our set up showed high lying left hemidiaphragm with gut loops in left hemithorax (Figure-1). Other work up including 2-D echo and septic screen was unremarkable. Child tachypnea and distress progressively worsened despite being on oxygen support and was placed on mechanical ventilation on next day.

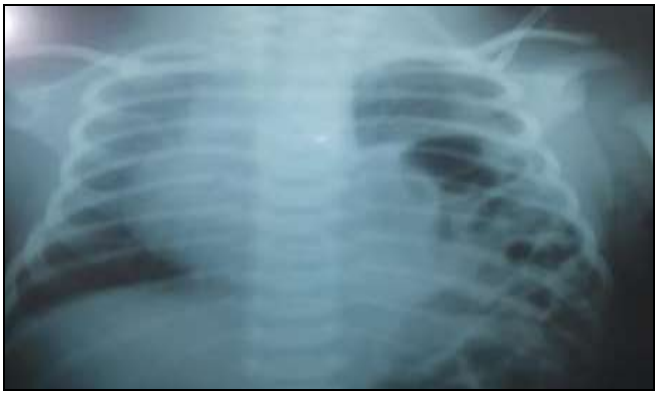

Figure-1: Chest x-ray on Presentation.

Child was optimized for surgery due to worsening distress and was operated on 4th postnatal day. Left sided subcostal incision was made. On opening the abdominal cavity, floppy, lax thin left hemidiaphragm popped out from the wound on giving positive pressure ventilation (Figure-2).

Redundant diaphragmatic tissue was excised and remaining diaphragm was repaired by interrupted mattress suture using PDS 3-0 (Figure-3). Child was nursed on mechanical ventilation till 6th postnatal day and was weaned off from mechanical ventilation followed by discharged on 9th postnatal day. Check x-ray showed inflated left lung with taut normally

Correspondence: Dr Muhammad Mudasir Saleem, Department of Peads Surgery, Combined Military Hospital, Lahore Pakistan

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repositioned left hemidiaphragm. Follow up at 1 month showed thriving child with well healed wound and normally positioned both hemidiaphragms.

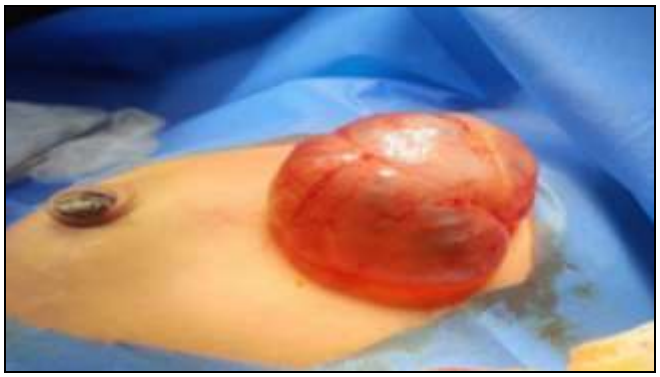

Figure-2: Floppy thin Left Hemi-Diaphragm Popping out Through Incision

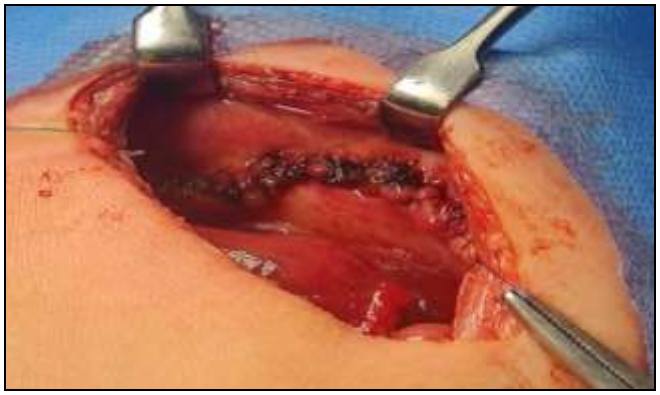

Figure-3: Repaired Diaphragm with Interrupted Mattress Sutures

DISCUSSION

Diaphragmatic eventration is caused by the replacement of diaphragmatic muscle with fibroelastic tissue, either completely or partially. Most of the cases are unilateral and congenital but it can occur bilaterally and after trauma, operative phrenic nerve injury or infection. Isolated congenital diaphragmatic eventration has a prevalence of 0.02 to 0.07 cases per 1000 live births and is responsible for 5% of all congenital diaphragmatic anomalies.[4] Most accepted etiology for eventration is the arrested or altered migration of myoblasts to septum transversum and pleuroperitoneal membrane during embryogenesis. Most common site for eventration is left hemidiaphragm as was in our index case, because left part of diaphragm is weak due to common cardinal vein atrophy as compared to right counterpart which has strong vascular concentration and is protected by liver.[5]

Presentation of diaphragmatic eventration has a wide spectrum starting from asymptomatic in neonatal period and late presentation in childhood with repeated episodes of pneumonias requiring hospital admission. Variable presentation with vague symptoms is also reported in literature by Konstantinidi and colleagues who reported a unique case of eventration presenting with gastrointestinal symptoms in a neonate.[6] Although fluoroscopic evaluation showing paradoxical diaphragm movements on affected site is the gold standard but it carries potential risk of radiation exposure and is not routinely performed making chest x-ray a reliable option showing abnormally high position of hemidiaphragm.[7] Diaphragmatic eventration leading to worsening respiratory distress in neonatal period as was in our case is rarely reported in literature. Sodhi KS reported one such rare case of respiratory distress in an infant due to bilateral diaphragmatic eventration.[8] Surgery with either plication or excision of redundant diaphragm with repair of residual tissue is the mainstay of treatment which can be performed through abdomen or thorax, either by open repair or by minimal invasive technique.[9] We preferred to operate by left subcostal abdominal incision as child was already on mechanical ventilation and laparoscopic or thoracoscopic repair could further deteriorate child condition by increasing risk of barotrauma.

CONCLUSION

Respiratory distress in neonates is mainly due to medical reason. Diaphragmatic eventration is a very rare cause of neonatal respiratory distress among surgical causes. Prompt diagnosis and early intervention are recommended to correct the underlying reason of distress.

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Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

MMS: Data acquisition, data analysis, critical review, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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