



# A Neonate with Eventration of Diaphragm

Rahul Sinha<sup>1\*</sup>, Shamsheer Dalal<sup>2</sup>, Kirandeep Sodhi<sup>3</sup>

<sup>1</sup>Pediatrics, Military Hospital, Jodhpur, India

<sup>2</sup>Neonatology, Armed Forces Medical College, Pune, India

<sup>3</sup>Command Hospital, Chandigarh, India

Email: [\\*drrahul\\_2000@yahoo.com](mailto:drrahul_2000@yahoo.com)

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## Abstract

A term male neonate weighing 2720 gm was born to Gravida 2 lady by normal vaginal route. The immediate post natal period was uneventful. At 12 hrs of life, the baby developed poor feeding and fast breathing and was shifted to NICU. The initial evaluation revealed decrease in air entry on left infraaxillary and infrascapular region. The lab investigation showed features of sepsis. The CXR showed raised hemidiaphragm with intact continuity on left side. The neonate was started on CPAP, antibiotics and IV fluids and was prepared for surgery.

## Keywords

Diaphragm, Neonate, Sepsis, CPAP

Subject Areas: Pediatrics

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## 1. Introduction

Eventration of the diaphragm is a disorder in which all or part of the diaphragmatic muscle is replaced by fibroelastic tissue. The diaphragm retains its continuity and attachments to the costal margin. Due to weakness of diaphragm it can displace thorax which can cause respiratory compromise. It is a rare anomaly with an incidence of 1 in 10,000 live births. Eventration of the diaphragm can be congenital or acquired. We report this rare condition in a term male neonate who presented with respiratory distress at 12 hrs of life.

## 2. Case Details

A 2.72 kg term male neonate was delivered to 30 years old Gravida 2 lady at term by normal vaginal route. The baby cried immediately after birth with APGAR 1 min 7/10 and at 5 min 9/10 and baby was given to mother for breastfeeding. The antenatal period was uneventful. The antenatal scan was normal. At 12 hrs of life baby de-

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\*Corresponding author.

veloped poor feeding and fast breathing and was shifted to NICU. The vital parameters revealed heart rate of 130/min, afebrile, RR 68/min with no retractions, NIBP 60/40 mm Hg, SpO<sub>2</sub> 90% room air and 95% with oxygen, CFT < 2 sec and all peripheral pulses was well felt. There was no dysmorphism. The systemic evaluation revealed there was decrease in air entry on left infra axillary and left infrascapular region. There was bowel sound heard on left lung base. The heart sound was shifted to right. The other system was essentially normal. The laboratory investigation revealed Hemoglobin: 17.4 gm%, PCV: 51% Total leucocyte count: 8900/DLC Polymorphs: 59, Monocyte: 05, Lymphocyte: 33, Platelets 1 lac/cmm, Blood sugar random 65 mg% Electrolytes Sodium/Potassium/Chloride/Calcium 140/4/98/4 (ionised) Total bilirubin 4.5 mg%, PBS initial normal after 24 hrs showed features of early sepsis, CRP neg, ABG Normal, Blood culture sterile. The chest X-ray revealed raised hemidiaphragm on left side with intact continuity (**Figure 1**). The ultrasound (abdomen) was normal and Ultrasound (chest) revealed eventration of diaphragm on left side. The echocardiography revealed cardiac shadow shifted to right with no structural anomaly. The neonate was managed with IV fluids, antibiotics, CPAP with PEEP 5 cm and FiO<sub>2</sub> 50% which was gradually weaned to head box oxygen and baby was prepared for definitive surgery. The plication of diaphragm on left side was done through abdominal approach. The post operative period was uneventful.

### 3. Discussion

Congenital diaphragmatic eventration may result from congenital phrenic nerve problem or a thin, abnormal diaphragm at birth. It is a rare anomaly with an incidence of 1 in 10,000 live births. Newborns may present with dyspnea, cyanosis, tachypnea, or vomiting secondary to gastric volvulus. Eventration was first described in 1774. The first successful repair in an adult was done in 1923 by Jean Louis Petit. The first successful repair in an infant was in 1946 by Bisgard. Eventration of the diaphragm can be congenital or acquired. Congenital eventration results from inadequate development of the muscle or absence of the phrenic nerves. The most common cause of acquired eventration is injury to the phrenic nerve, resulting from either a traumatic birth or thoracic surgery for congenital heart disease [1]. The exact aetiology of congenital diaphragmatic eventration is unknown, although it may be associated with fetal rubella or cytomegalovirus infection [2]. In some cases, it may be difficult or impossible to distinguish from diaphragmatic paralysis. In eventration, the diaphragm retains its continuity and attachments to the costal margin. With diaphragmatic hernia, in contrast, this continuity between the diaphragm and the costal margin is disrupted [1]. Diaphragm is uniform in eventration but with sac in diaphragmatic hernia. There is no pulmonary hypoplasia in eventration compared to diaphragmatic hernia; therefore it is undetected at birth and is picked up as a coincidental finding [2] [3]. Clinical manifestations range from asymptomatic to life threatening respiratory distress requiring mechanical ventilatory support [2]. It usually remains asymptomatic in



**Figure 1.** CXR showing raised hemidiaphragm on left side with intact continuity and shift of cardiac shadow to right.

early life and presents later with respiratory and occasionally gastrointestinal complications [1]-[4]. The respiratory complications are more in children compared to adults. Eventration of diaphragm in children may require surgical treatment to restore normal pulmonary parenchymal volume. Plication is the treatment of choice [2] [4]-[6]. Thoracoscopic surgery avoids the problems of open surgery [7].

Associated findings include Horner's syndrome, contralateral ptosis, and chest wall deformities with and without missing ribs, hypoplastic lung, gastric volvulus, hypoplastic ribs, coarctation of the aorta, cleft palate, hemivertebrae, congenital heart disease, renal ectopia, hypoplastic aorta, situs inversus, and club foot. In the present case, a diagnosis of left eventration of diaphragm was made based on clinical and radiological findings and was managed successfully with plication of diaphragm.

## Conflicts of Interest

None.

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