Case Report

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# Spontaneous Bilateral Pneumothorax in the Newborn

**Gaurav Singla, MD; Kamaldeep Arora, DM; Harmesh Singh Bains, MD; Tanya Thakkar, MD**

**Abstract**

Pneumothorax is a recognised cause of respiratory distress in the neonatal period. It may occur spontaneously (idiopathic) or secondary to various underlying lung diseases. In considerable cases of pneumothorax, intercostal drain is inserted to relieve respiratory distress. Pneumothorax results in longer hospital stays due to the requirement of these surgical interventions. But, here we would like to take the opportunity to share our clinical experience of the newborn with spontaneous pneumothorax with mild to moderate respiratory distress who recovered completely with conservative management with an oxygen-enriched atmosphere and no surgical intervention.

**Keywords**: Spontaneous pneumothorax; Newborn; Pneumothorax; Intercostal drain.

## Introduction

Spontaneous pneumothorax can occur in the newborn infant and if not recognized may have fatal consequences. It should be suspected in any infant with respiratory distress. In children, incidence of spontaneous pneumothorax is highest during neonatal period, most probably due to high transpulmonary pressures generated with onset of breathing. Detection in newborn infants depends as much on a high degree of awareness of its possibility as on the knowledge of its predisposing factors and cincial features. The estimated incidence varies from 0.3% to 1.3% based on clinical symptoms or on radiological findings respectively.[1,2] We present here a case of bilateral pneumothorax in neonate which was managed conservatively with high oxygen flow without any surgical intervention.

**Author Affilation:** *MD, **DM, ***MD, ****MD, Division of Neonatology, Department of Pediatrics, Dayanand Medical College & Hospital, Ludhiana, Punjab, India.

**Reprint request: Kamaldeep Arora,** DM, Neonatology, Division of Neonatology, Department of Pediatrics, Dayanand Medical College & Hospital, Ludhiana, Punjab, India

E-mail: dockamalpaeds@yahoo.com



*Case report*

A 3350 gm female infant was born at term gestation (39 weeks) by caesarean section (indication-non progression of labour) to a primi gravida mother after an uneventful antenatal period. There was no history of any trauma during delivery or meconium stained liquor. Baby cried immediately after birth and did not require any resuscitation but shortly, developed tachypnea with grunting and cyanosis. She required supplemental oxygen via head box with resolution of cyanosis, but respiratory distress persisted Physical examination revealed a heart rate of 156 beats/min, capillary refill time of 2 seconds, good volume pulses and respiratory rate 68 breaths/min. Breath sounds were decreased bilaterally with no crepts or wheeze. Moderate chest retractions with RDS score (Downe's) of 4-5 was recorded. Rest of the systemic examination was normal. An arterial blood gas measurement in 40% ambient oxygen revealed a pH of 7.201, $PaCO_2$ of 62 mmHg and $PaO_2$ of 80 mmHg with base excess of - 8.0. The chest radiograph revealed bilateral pneumothoraces with normal pulmonary vasculature and normal cardiac silhouette (Fig 1). Septic profile and blood culture were negative. She was managed with high flow oxygen via oxygen hood. Respiratory distress decreased within 24 hours and she was off oxygen after 72 hours. She did not require

**Figure 2: Chest Xray (AP view) showing resolution of bilateral pneumothoraces**

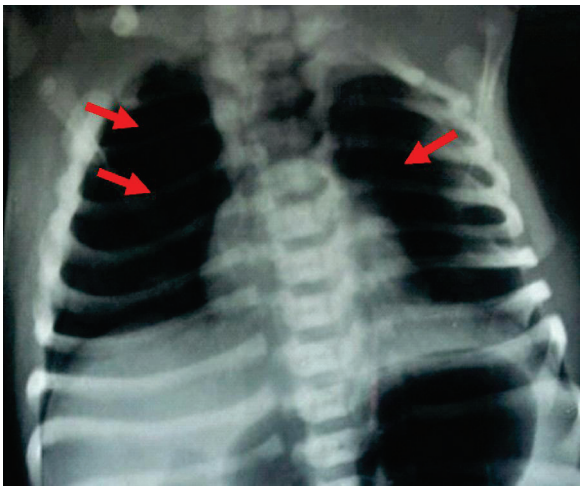
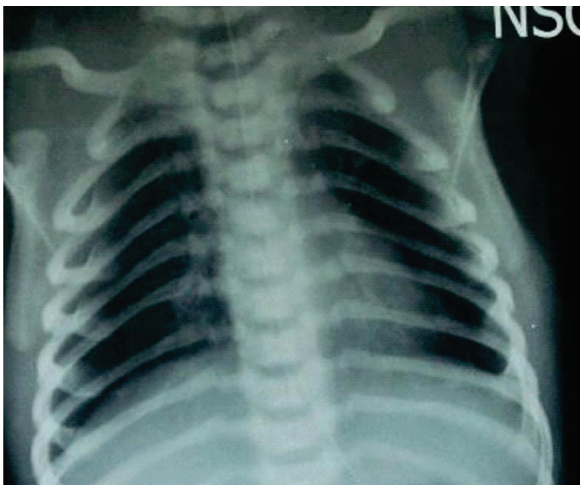


**Figure 2: Chest Xray (AP view) showing resolution of bilateral pneumothoraces**



any surgical intervention in form of needle thoracocentesis or chest tube placement. Repeat chest radiograph done after 24 hours showed resolution of pneumothoraces (Fig 2).

## Discussion

Spontaneous pneumothorax is a recognised cause of respiratory distress in newborn period. The estimated incidence of spontaneous pneumothorax varies from 0.3% to 1.3% based on clinical symptoms or on radiological findings respectively.[1,2] In the newborn period, pneumothorax may occur spontaneously (idiopathic) or secondary to underlying lung diseases such as respiratory distress syndrome, meconium aspiration syndrome, vigorous resuscitation, positive pressure ventilation, pulmonary hypoplasia, pneumonia and congenital pulmonary cystic malformations. Yu *et al* [1] studied the clinical course of pneumothorax and its allied conditions in 34 newborn infants. They found an overall incidence of 3/1000 live births. 11 term infants without obvious pulmonary pathology presented early (within minutes of birth); 6 of these had aspirated meconium or blood. The remaining 23 were preterm infants with hyaline membrane disease (HMD) and accounted for 68 % of the infants.

Spontaneous pneumothorax at birth may result from rupture of alveoli secondary to high pressure needed to expand previously uninflated lungs or from uneven distribution of inflating pressures among groups of alveoli. Administration of 100% oxygen (nitrogen washout therapy) to infants with pneumothorax accelerates the resolution of air leaks and shortens the duration of extra pulmonary air collection from 2 days to 12 hours.[3] Al Tawil *et al* conducted study on 80 newborns with spontaneous pneumothorax in which majority of them were managed conservatively. Only 6/80(7.5%) symptomatic term infants with spontaneous pneumothorax required chest tube insertion or needle thoracocentesis.[4]

It should be stressed that infants with even a small pneumothorax should be placed in an atmosphere with moderately high concentration of oxygen. In an infant who develops a pneumothorax in room air, a good percentage of air, present in the pleural space will be composed of nitrogen. If the child is then placed in oxygen enriched environment, the blood and tissues become saturated with oxygen. There will be a much higher gradient between the nitrogen content in the pleural space and that in the tissues. This will stimulate a more rapid absorption of the nitrogen from the pleural space, and the pneumothorax may absorb rapidly.

## Conclusion

All cases of pneumothorax in newborns do not require intercostal drain. Newborn with spontaneous pneumothorax having mild or moderate distress may recover completely with no treatment other than observation in an oxygen-enriched atmosphere.

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# Management of Pediatric/Neonatal Emergencies Current Evidence from Cochrane/Other systematic Reviews

## Clinical Question: Second Line Agent in Status Epilepticus: Phenytoin or Valproate

**Deepak Sachan, MD**

**Abstract**

In this article, we have tried to review the evidence regarding the use of second line agents in status epilepticus, comparing phenytoin and valproate in particular. While phenytoin continues to be used as the preferred second line agent, valproate is equally effective and safe. However, there is need for generating more evidence particularly with respect to safety profile of these two drugs in comparison to each other so that, a consensus may be arrived at in future as to, which is the best second line drug among these two agents in terms of both safety and efficacy.

**Keywords:** Phenytoin, Valproate; Status epilepticus; Second line agents; Diazepam; Midazolam.

*Case scenario*

A 5 year old child was admitted to pediatric emergency unit with generalized seizures from last 15 minutes. There was no history of fever, vomiting, headache or head injury. On examination child was unconscious and generalized tonic–clonic movement were seen along with frothing from mouth.

Child was stabilized and was put under oxygen. Immediately after accessing IV line benzodiazepam loading dose was given. Seizures continued for 5 minutes. Now what should be the management strategies?

1) What should be our second line drug; Phenytoin, Valproate or others?
2) What is the evidence of second line drug for SE?
3) How should we monitor the patients?
4) Any future or newer therapeutic modalities are available?

Let us briefly review the evidence to answer the above questions…..

### Introduction

Status epilepticus is a major neurological emergency with an incidence of about 20/100,000 and mortality between 3 and 40 % depending on etiology, age, status type, and status duration.[7] Benzodiazepam and Phenytoin/Fosphenytoin are traditionally used as first line drugs and are effective in about 60% of all episodes. However, a notable portion of patients remain in SE. unfortunately, high level evidence is available only for the first-line medication; in particular for lorazepam which had been shown to be more effective than phenytoin (PHT) or placebo.[2,9] However, because first line therapy fails to control at least 35-45% of patients with SE[2], additional treatment are needed, for whom convincing evidence is lacking. Historically, phenytoin[1] has been used before valproic acid (VPA)[3,4] as a second-line agent.

**Author Affilation:** *Associate Professor, Department of Pediatrics, Postgraduate Institute of Medical Education and Research (PGIMER), Dr R.M.L Hospital, New Delhi.

**Reprint request: Dr Deepak Sachchan,** Associate Professor, Department of Pediatrics, PGIMER, Dr RML Hospital, New Delhi, India.

E-mail: jhumaji@gmail.com

**Table 1: Common etiology of status epilepticus in children**

| |
|---|
| **1. Acute** |
| • Acute CNS infection (bacterial meningitis, viral meningitis, encephalitis) |
| • Metabolic derangement (hypoglycemia, hyperglycemia, hyponatremia, hypocalcaemia, anoxic injury) |
| • AED noncompliance or withdrawal |
| • Prolonged febrile convulsion (23%–30%) |
| **2. Remote** |
| • Inflamatory granuloma |
| • Cerebral migrational disorders (lissencephaly, schizencephaly) |
| • Perinatal hypoxic-ischemic encephalopathy |
| • Progressive neurodegenerative disorders |
| **3. Idiopathic/cryptogenic** |

A small prospective randomized study[5,6] analyzed PHT and VPA after diazepam failure and showed that both drugs were surprisingly highly effective (controlling SE in 88% and 84% of patients, respectively). More recently, levtiracetam (LEV)[7,8] has also been described for this indication, but again without any comparison to other agents. To address this relevant lack of information, we searched medical database to investigate the relative role of PHT, VPA and LEV in the treatment of SE as second line agent.

*Definition*

SE is defined as a single seizure lasting more than 30 minutes or repeated seizures over a period of more than 30 minutes without gaining consciousness. However, for practical reasons, this definition was recently modified by working group on status epilepticus[4]: particularly for generalized seizures, seizures activity persisting for more than 5 minutes is considered to be SE and should be treated accordingly.[9]

*Epidemiology*

The average incidence of SE is at least 20/100,000 for the Caucasian population in industrialized countries.[7] The incidence from developing world is lacking. The incidence of SE has a bimodal distribution, with the highest incidences during the first year of life and after the age of 60. Among children, babies younger than 12 months had the highest incidence and frequency of status epilepticus. The most common cause in children is febrile seizures or infections, accounting for more than 52% of pediatric cases (Table 1). Remote symptomatic cause and low antiepileptic drug levels account for another significant percentage in children. Patient age at diagnosis, etiology of SE, severity of underlying disease, and duration of SE are the main predictors of increased short term mortality.[11-13] Therefore early and aggressive treatment is very important for successful management.