

CASE REPORT

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Pneumothorax in the newborn due to oxygen therapy through the intubation tube; A case report **Murat Kuru¹**,  **Fatma Durak²**,  **Selda Yavascan²**¹*Omer Halisdemir University, Training and Research Hospital, Department of Thoracic Surgery, Nigde, Turkey*²*Omer Halisdemir University, Training and Research Hospital, Department of Pediatrics, Nigde, Turkey*

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Abstract

Pneumothorax is one of the major causes of respiratory distress in newborns. This disorder may develop in newborns who have lung disorders such as respiratory distress syndrome, meconium aspiration syndrome or resuscitation. The diagnosis is based on chest radiography after physical examination in newborns with respiratory distress. The treatment is oxygen therapy or tube thoracostomy. We report a case of bilateral pneumothorax in a newborn who was given high pressure oxygen due to intubation tube.

Keywords: Pneumothorax, newborn, oxygen**Introduction**

The presence of air in the pleural space is defined as pneumothorax. This situation may be spontaneous or may occur due to different reasons. Pneumothorax in the newborn is one of the most serious respiratory distress causes and requires immediate treatment. Although the incidence in neonates is reported as 1-2% and in those whose birth weight is below 1500 g, is reported as 5-7%, it may be up to 30% in patients with underlying lung problems and those requiring mechanical ventilation [1]. Pneumothorax is a disease with high mortality and morbidity unless it is diagnosed early and treated quickly [2]. In this article, we present a case that is intubated after birth, developed bilateral pneumothorax after high-pressure oxygen delivery through the intubation tube during transfer, and treated with tube thoracostomy.

Case Report

A male baby, born via cesarean section in the 39th week weighing 3060 g, with meconium aspiration, as the fifth living of the six pregnancy of 30-years-old mother, was intubated in the operating room due to lack of spontaneous respiration. (APGAR 1st min: 5,

5th min: intubated) Under the radiant heater, intra-oral and in-tube aspiration was performed. The transfer of the vitally stable patient to the neonatal intensive care unit was planned. While the patient was taken to the incubator during transfer, 7lt / min free flow oxygen was given for a short time from inside the tube. In the meantime, sudden cyanosis development was noticed in the patient. Common subcutaneous emphysema was noticed in the neck and trunk of the patient, whose saturation could not be measured with the finger probe, the respiratory sounds were inaudible and in whom the bradycardia (15 / min) has developed Bilateral needle aspiration was performed to the patient with a prediagnosis of bilateral pneumothorax. The patient whose cyanosis improved, heart rate became 100 / min, SpO₂: 86 after aspiration, was taken to the neonatal intensive care unit. Upon the detection of bilateral pneumothorax and pneumomediastinum (Figure 1) on PA radiography, 8F chest tube was applied bilaterally and connected to closed underwater drainage. (Figure 2) In the arterial blood gas, the values were pH: 7.18, paCO₂: 47mmHg, paO₂: 36mmHg HCO₃: 15 mmol /L. The patient was connected to the mechanical ventilator and the follow-up was started in SIMV mode. The patient with CK: 1363, CK-MB: 31 in the biochemical evaluation, who was mild hypoactive, has no seizure and whose arterial blood gas base deficit was observed as -10 was considered as stage 1 hypoxic-ischemic encephalopathy. However, hypothermia treatment was not needed because the patient did not meet the hypothermia criteria. The treatment of IV Ampicillin / Sulbactam / Amikacin and 10% dextrose was given. On the second day of hospitalization, total parenteral nutrition was started. The right chest tube of the patient, who was

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followed up with daily chest radiographs, was withdrawn on the 3rd day of hospitalization, left chest tube on the 4th day, following the aspiration. Control chest radiography was in expansive appearance. (Figure 3) Transfontanelle ultrasonography was reported as normal. The patient, who could not tolerate extubation on the 7th day, had leukocytosis and peripheral smear shifted to the left, CRP: 22, and paracardiac infiltration in the PA x-ray, was started treatment of iv vancomycin/meronem. The patient's clinic improved with the use of vancomycin/meronem, and the oxygen requirement decreased. The patient, extubated at postnatal 20th day, oral intake was started and weight gain was good, was discharged with full recovery on the 25th postnatal day.

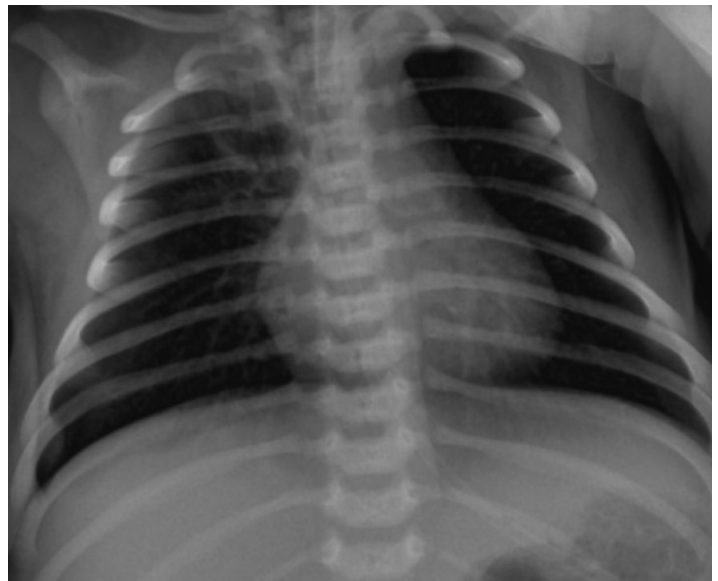


Figure 3. Chest x-ray after pneumothorax treatment

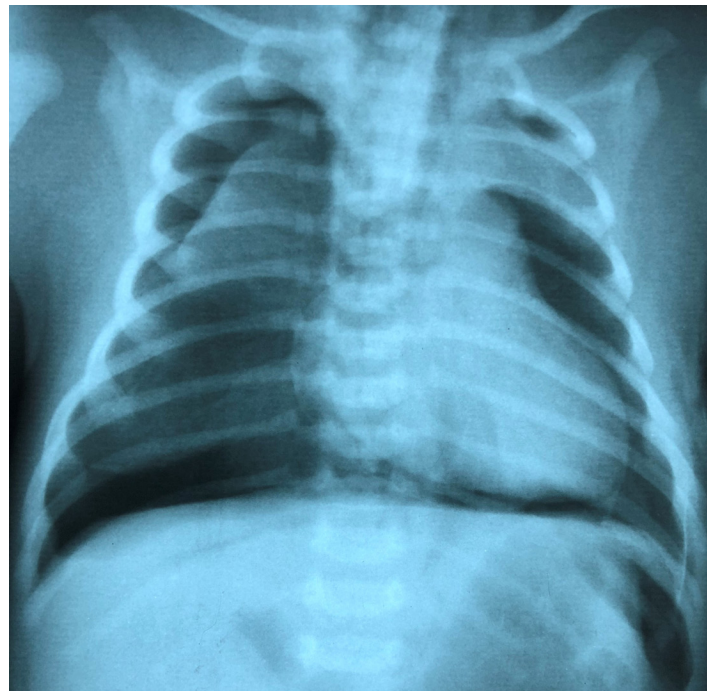


Figure 1. Chest x-ray shows bilateral pneumothorax and pneumomediastinum

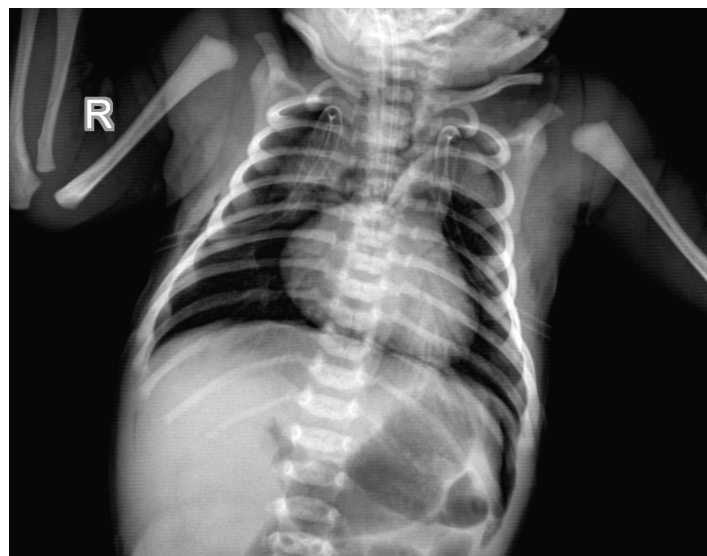


Figure 2. Chest x-ray after bilateral tube thoracostomy

Discussion

Although there is a very low amount of fluid between the visceral and parietal pleural folium, there is no air. The presence of air in the intrapleural space is defined as pneumothorax. Air intake in pneumothorax is caused by a damage in the visceral or parietal area. This condition may occur spontaneously, or it can be observed as trauma or iatrogenic. Although the incidence in neonates is reported as 1-2% and in those whose birth weight is below 1500 g, is reported as 5-7%, it may be up to 30% in patients with underlying lung problems and those requiring mechanical ventilation [1]. There are no studies on bilateral pneumothorax in newborns in the literature. In studies conducted in different neonatal intensive care units in Turkey, this rate was found to be 1.3-10.8% [3,4]. In baby boys, the incidence of spontaneous pneumothorax is 2 times higher than in girls [5]. The incidence of pneumothorax may be higher in neonatal respiratory distress syndromes. The development of neonatal spontaneous pneumothorax is related to the mechanical problems of the expansion of the lung at the initial moment. The high transpulmonary pressure caused by the onset of the breath leads to alveolar rupture and causes pneumothorax. Pneumothorax in children is most commonly encountered in the neonatal period and most frequently in the first three days and unilaterally [6]. In our case, it was bilateral. Although the mortality rate was higher in bilateral pneumothorax cases in the literature, our patient survived despite there were additional problems. Tachypnea, dyspnoea, cyanosis, subcutaneous emphysema, a decrease in single or double breath sounds, and sudden developing saturation decrease should bring pneumothorax to mind during physical examination of the newborn. PA chest x-ray which is taken in case of doubt helps us to confirm the diagnosis. While pneumothorax in 15-20% of the hemithorax seen in lung x-rays of the adults can be followed-up with oxygen therapy and daily chest radiographs, newborns should be followed-up closely by being more careful. Clinically stable minimal pneumothoraxes can be monitored conservatively, but most patients require tube thoracostomy. In cases where intubation and positive pressure ventilation is applied, tube thoracostomy should be performed without waiting for the pneumothorax because it may increase rapidly and even tension pneumothorax may occur. The relative narrowness of intercostal space in the newborn to the thorax

tube to be used increases the complication rate [7]. We used an 8F guided thoracic drainage in this case as in the case of newborns with pneumothorax.

Pneumothorax is a life-threatening condition with reported high mortality rates (20-60%) [6]. In cases where there is prolonged air leakage after tube thoracostomy due to lung parenchymal disease, surgery may rarely be required. Bhatia and Matthew suggested pneumothorax lasting more than 7 days to be called persistent pneumothorax [8]. In a study, the use of surfactants in the newborn has been shown to be a risk factor [9]. In another study, PDA, persistent pulmonary hypertension and other congenital anomalies are seen to significantly increase mortality in newborns with pneumothorax [10].

Strict management of indications for cesarean section, keeping PIP at a low level during mechanical ventilation, and use of pulmonary surfactant are helpful in preventing neonatal pneumothorax[11].

Conclusion

Although pneumothorax is a common and life-threatening condition in neonatal intensive care units, immediate intervention after diagnosis is life-saving. It should be kept in mind in the diagnosis of the patients with risk factors and sudden general condition deterioration, patients with respiratory distress.

Conflict of interests

We declare that we have no conflict of interest.

Financial Disclosure

This study received no financial support.

Ethical approval

Informed consent form was signed by the family

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