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CLINICAL PROFILE AND OUTCOME OF NEONATAL PNEUMOTHORAX IN TERTIARY CARE CENTRE IN CENTRAL INDIA.

Paediatrics

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ABSTRACT

Neonatal pneumothorax is a life-threatening emergency situation. Respiratory distress syndrome, meconium aspiration, birth trauma or positive pressure ventilation may cause pneumothorax in neonates. It may manifest as respiratory distress, hypoxemia or respiratory failure depending upon severity of pneumothorax and eventually may cause compromise of cardiac function. Early radiological diagnosis by chest radiograph, point of care Ultrasonography, emergency needle thoracocentesis and supportive care may improve the outcome of pneumothorax. In this case report, we present a case of a full-term new born baby who required positive pressure ventilation with Ambu-Mask, who developed severe respiratory distress in immediate postnatal period after resuscitation. Early diagnosis of pneumothorax with chest radiograph and ultrasonography was done. Pneumothorax lead to cardiac function compromise which necessitated emergency needle thoracocentesis. Intercostal drainage tube was placed and secured for definitive resolution. Hence, patient was stabilized because of timely diagnosis and expeditious intervention.

KEYWORDS

Pneumothorax, thoracocentesis, new born, Intercostal drainage tube

INTRODUCTION:

Pneumothorax is a life- threatening condition that requires immediate intervention. It is a common cause of death among neonates, if inappropriately treated.[1] Aspiration of meconium, birth trauma, underlying lung diseases or positive pressure ventilation can cause pneumothorax in newborns.[2] Spontaneously occurring pneumothoraces have also been reported.[3] Most neonates suffering from pneumothorax remain asymptomatic. Chest X-ray is the gold standard for its diagnosis.[4] Pneumatosis in the thoracic cavity can also be diagnosed by transillumination of the chest using a fibre- optic light or lung ultrasonography.[5,6] Small asymptomatic pneumothoraces might only need monitoring; larger and especially tension pneumothoraces require immediate treatment. They can either be managed using needle thoracentesis or inserting a chest tube connected to an underwater seal with continuous suction.[7] However, in low-income countries, medical diagnosis and treatment can be greatly impeded by a lack of resources and medical devices, such as underwater seal drains.

CASE PRESENTATION:

A gravida 5 mother, known case of gestational diabetes mellitus with history of 3 previous spontaneous abortions, delivered vaginally a female newborn weighing 2.8 kg after 38 weeks of gestation with loop of cord around neck. Baby did not cry after birth and had an APGAR score of 3/10 at 1 min and 4/10 at 5 min, received positive pressure ventilation with AMBU bag and mask. Post PPV, activity improved but baby had severe respiratory distress with a Downe's score of 7/10, hence was intubated in the labour room itself and was immediately shifted to NICU on bag and tube ventilation. Chest Xray was done in NICU within 1 hour of life and showed increased luscency in the right side of lung with shift of mediastinum to the left as shown in figure 1. Baby was kept on invasive mechanical ventilation on optimal settings and was maintaining an oxygen saturation of 82%. Chest wall was asymmetrical with bulge on the right side. Needle decompression of the chest was done using a 22G needle, inserted in the 2nd intercostal space along the midclavicular line.

The system was closed using common plasters and a needle was inserted into the bottle serving as an air release valve. The circuit was checked for oscillation in relation with the patient's respiratory movements. Baby improved clinically after needle decompression as seen in figure 2. Antibiotic treatment was started with Cefotaxime 100 mg/kg, two times a day and 24- hourly amikacin 15 mg/kg. After 7 hours of life, distress increased and baby went into shock, inotropic support was initiated after fluid bolus administration and Chest Xray was repeated which was suggestive of persistent right sided pneumothorax which increased in size as seen in figure 3. Intercostal drainage was planned and secured by general surgeon and chest xray done(figure 4, Image 1). After 24 hours of placement of ICD tube, there was no air column movement, hence it was clamped for the next 24 hrs and baby was observed. There was no deterioration in cardiorespiratory status of the baby hence baby was extubated and shifted to continuous positive airway pressure ventilation, after 48 hours of invasive ventilation. Altered gastrointestinal aspirate was observed on day of life 4 with positive septic screen, hence antibiotics were upgraded to injectable Meropenem and Collistin. Also, Vitamin K was given and Fresh frozen plasma transfused to the baby for the same. Baby improved hemodynamically over the next 24hours, hence inotropes were gradually tapered and omitted. By the end of 7th day of life, child was off inotropic support and saturation was 94% on oxygen support by free flow at 2L/min, therefore, ICD was removed with aseptic precautions and feeds were initiated. Repeat imaging was done 12 hours after ICD removal which showed radiological improvement with decreased luscency as seen in figure 5. On day of life 9, baby was maintaining saturation on room air, breastfeeding was established and antibiotic coverage was given for 14 days and then discharged.

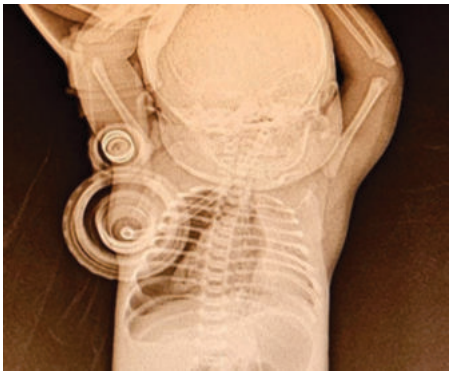

Figure 1: Right sided pneumothorax

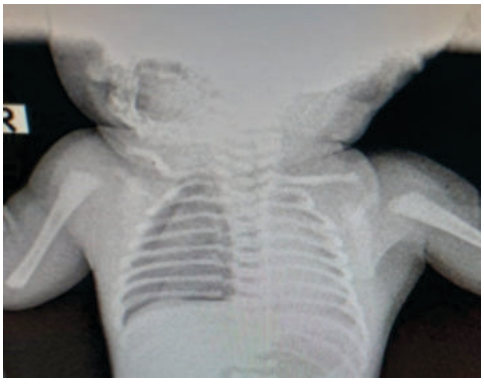

Figure 2: Xray Post Needle Thoracocentesis

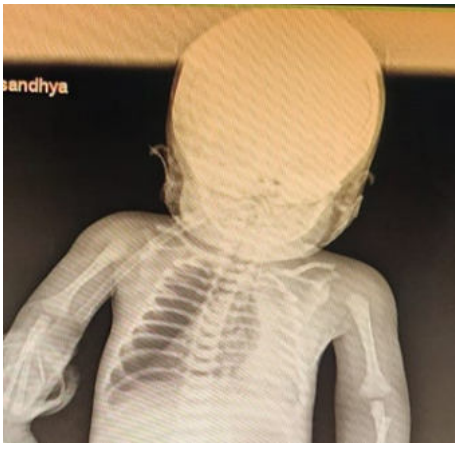

Figure 3: Right sided pneumothorax

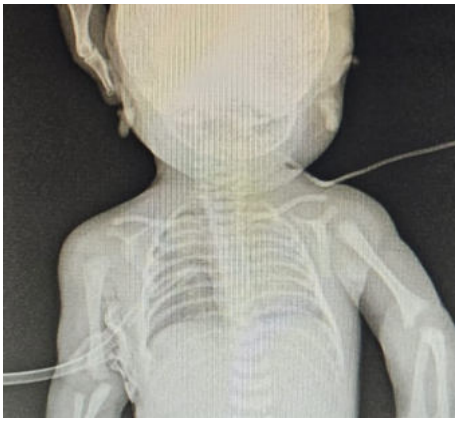

Figure 4: Xray post ICD drainage

Image 1: Baby after ICD insertion

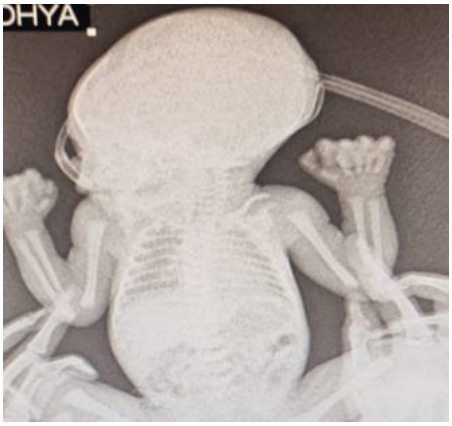

Figure 5: Xray showing improved lung fields after removal of ICD

DISCUSSION:

This case report shows that timely diagnosed neonatal pneumothorax can be managed even in settings with limited resources. In developing nations, medical diagnosis and treatment of life- threatening conditions can be impeded by a lack of access to medical devices. Newborns are a particularly vulnerable population to the delay of adequate treatment. Pneumothorax is a common and potentially life-threatening disease in neonates that often requires prompt thoracentesis and continuous thoracic drainage using equipment, such as underwater seal drains. In healthcare settings where prepacked and dedicated items for specific purpose are not available, these alternative devices have to be manually assembled using accessible parts intended for other usage.

Pneumothorax can cause neonatal respiratory distress. It can occur spontaneously or secondary to respiratory distress syndrome, aspiration of meconium, etc. The incidence of pneumothorax is 1 to 2% in term newborns.[8,9] It increased to about 6% in premature babies because of poor lung compliance.[10] In one study the frequency of pneumothorax was found to be 3 per 1000 live births.[11]

Spontaneous pneumothorax at birth results either from rupture of alveoli secondary to high pressure needed to expand previously uninflated lungs or from uneven distribution of inflating pressures among alveoli. In familial cases of spontaneous pneumothorax, folliculin gene disorders or α1-antitrypsin deficiency should be ruled out.[12] Sometimes cystic fibrosis may present with bilateral spontaneous pneumothorax during newborn period.[13]

Administration of high flow or 100% oxygen (nitrogen washout therapy) accelerates the resolution of pneumothorax.[14] To conclude, 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. Tension pneumothorax causing hypoxemia and cardiac compromise warrants urgent needle thoracocentesis. Persistent pneumothorax may require intercostal drainage tube insertion until complete resolution.

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