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A Case Report on Recurrent Pneumothorax in a Premature Baby

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Abstract: ***Premature birth is usually associated with a lot of complications. Here, pertaining to this case report, a preterm baby boy was born by normal vaginal delivery at gestation age of 24 weeks and 3 days with APGAR score of 5/10 at 1 minute and 7/10 at 5 minutes respectively. The baby was screened for all the issues which usually a preterm baby will hold at birth. On baby's day 6th of life, diagnosis of right sided Pneumothorax was evident, things gone worsening thereafter, following which multiple co morbidities stroked the baby which led to difficulty in the treatment strategy. However, step wise approach was equipped by the team of neonatology intensive care unit in treating the conditions ensuring positive outcome from the same. In addition, extreme care was taken in dealing with this case, since the baby was extremely immune - compromised and the COVID - 19 spread was on the peak by that time.***

Keywords: Pneumothorax, newborn, risk factors, mechanical ventilation, neonatal intensive care, mortality

1. Introduction

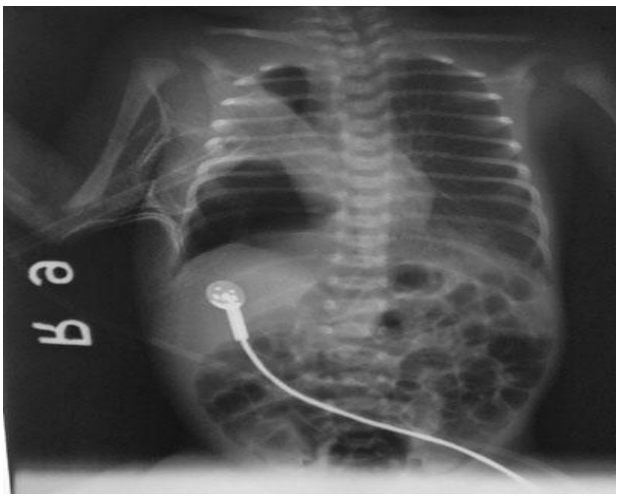
Premature babies, especially those born at an early stage often have complicated medical complications. Apparently, issues with prematurity vary. However, the earlier your baby is born, the greater is the risk for complications. Here, one such extreme preterm baby was admitted in the NICU ward of the hospital, with respiratory support to deal with the initial distress.

Likewise of all the short term complications which comes with the initial days of preterm birth, the baby here also had respiratory issues, septicemia, premature anemia, bone disorders, varying glucose levels (especially hypoglycemia), vision problems, for which stepwise treatment was given according to the laid authenticated guidelines.

Most importantly, the follow - up of the patient for long term complications is utmost important. Complications like Cerebral palsy, vision problems, hearing problems, and Behavioral and Psychological problems must be scrutinized regularly during the growing age of the baby.

2. Case Report

A live preterm baby boy was born by normal vaginal delivery at gestation age of 24 weeks and 3 days with APGAR score of 5/10 at 1 minute and 7/10 at 5 minutes respectively. Baby did not cry and had poor respiratory efforts, hence received positive pressure ventilation followed by elective intubation at 5minutes of life due to extreme prematurity. The baby was shifted to NICU for further management and preterm care.



Trans - illumination Pneumothorax in the newborn

Baby was started on conventional mode of ventilation with rate of 40/mins andchest X - ray showed features of mild RDS and blood gas was also suggestive of the same. Ventilator settings were sequentially adjusted according to blood gases measurement. At 36hours of life, baby had oxygen desaturation and increasing ventilator requirements.

Repeat chest X - ray showed worsening of RDS, hence surfactant (curosurf) was administered following which the baby improved and pressure was reduced briefly.

On day 3 of life, baby had an episode of desaturation and bleeding from ET - Tube. Hence baby was reintubated and treated with blood products (FFP, PRBC) and vitamin k required. Chest X - ray showed bilateral increased haziness.

On the day 6 of life, baby had persistent desaturation which did not improve with maximum ventilator settings. Transillumination revealed right sided pneumothorax. Hence, strict aseptic precaution intercostal drain was inserted into the right 5th intercostal space and connected to an underwater seal and its position was conformed within Chest X - ray. As the baby had arecurrence of pneumothorax, negative suctioning pressure was needed in addition to the intercostal drain to maintain adequate oxygenation.

Pediatric surgeon and pulmonologist opinion were obtained who opined to remove the intercostal drain after successful wearing from the ventilator, to prevent recurrence of pneumothorax. A CT chest was also suggested if the baby was dependent on the intercostaldrain for the prolonged period. ICD was successfully removed at day 43 of life; Postremoval, which baby was stable with good oxygen saturation on high flow nasal cannula on minimal oxygen requirement for 63 days. Due to long standing dependency on oxygen flow support, a course of vitamin A, Azithromycin, Budesonide, Ipratropium nebulization, diuretics and mucolytic along with physiotherapy were tried to facilitate weaning from oxygen support. Finally the baby was weaned to room air. Thereafter the baby maintained oxygen saturation in room with no increased labour of breathing.

Baby initially required inotropic support dobutamine (up to 20mcg/kg/min), dopamine (20mcg/kg/min) and nor adrenaline (up to 1 mcg/kg/min) to maintain normal mean arterial pressure. ECHO done on day 7 showed patent Foramenovule, with structurally and functionally normal heart. Gradually inotropes were tapered and stopped by day 20 of life, Repeat ECHO on 16thday oflife showed similar finding.

In view of premature labour, sepsis was suspected and baby was started on intravenous piperacillinand fluconazole prophylaxis due to extreme prematurity at birth after sending septic screen. Initially total counts, CRP andblood culture were sterile, hence piptaz was given for a course of 4 days. On day 7, Endotracheal secretion grew positive culture for Burholderiacepacia and enterobacter cloacae, antibiotic injection meropenamfor 8days was given a de - escalated to injection ceftazidime for 5 days after ensuring declining CRP trends.

In view of clinical detoriation and falling blood countsantibiotic were escalated to vancomycin, polymyxin - B after insertion of intercostal tube in view of negative cultures, infectious disease specialist opinion was obtained, Owing to premature labour, raised beta D Glucon levels and negative blood culture for bacteria, invasive disseminated candidemia was suspected and amphotericin B was started after which baby developed repeated episode of hypokalemia needing intravenous potassium chloride correction. Hence, it was switched over to micafungin and treatment dose of fluconazole was added for CNS penetration for a total duration of 21 days. Lumbar puncture was deferred in view of hemodynamic instability.

On day 91 of life, because of fever, a partial sepsis screening was sent and baby was started intravenous antibiotics injection cefaperazone +sulbactam and oral Azithromycin. Testing for Covid - 19 was also done, which was negative. After the sepsis screen turned out negative, cefaperazone was stopped and Azithromycin was given 5 days.

Due to multiple episode of significant bleeding, fresh frozen plasma for a total of 8 units was administered. In view of dependency on oxygen and anemia of prematurity, the baby needed PRBC transfusion for a total 0f 6 units, baby was started on oral treatment dose of iron and folate supplements after reaching full feeds, latest hemogram revealed hemoglobin 11.2g/dl on day 88 of life.

Umbilical artery and venous catheters were inserted at birth for invasive blood pressure monitoring and intravenous medication and total parenteral nutrition. Right axillary arterial line and right great saphenous vein PICC line were inserted following removal of umbilical lines on day 10.

Inguinal hernia the baby was found to have bilateral inguinal hernia which was reducible in nature, for which pediatric surgeon, opinion was sought and surgery was advised after gaining appropriate weight of 2.5 - 3kg or earlier if sign of obstruction occurs. Warning signs were explained and parents were counseled to have a pediatric follow up when the baby gains appropriate weight.

Minimal enteral nutrition with mother’s breast milk and donor expressed milk and human milk fortifiers stepped up to full orogastric feeding. The baby tolerated bottle feeding well without respiratory distress or oxygen desaturation.

Neonatal hyperbilirunemia - serum bilirubin at 24 hrs of life was raised (6.1mg/dl) and double surface phototherapy was given for 24hrs rebound jaundice (9.9mg/dl) occurred on day 7 of life for which again phototherapy was restarted and given for 36hrs prior to stopping. There was no blood group incompatibility between the baby and the mother.

3. Discussion:

Pneumothorax may be life - threatening which is defined as abnormal collection of gas in the pleural space between the lungs and the chest wall. The most common cause includes respiratory distress syndrome, condition occurring in premature babies, as here is the case. Meconium aspiration syndrome is another such cause of pneumothorax in newborns. The meconium may obstruct the airways and cause breathing problems. Other sources comprises of pneumonia (infection of the lung) or underdeveloped lung tissue. Pneumothorax in newborn is evident to cause significant morbidity and mortality. It may even increase chronic lung disease in VLBW neonates and intraventricular

hemorrhage in preterm neonates.1Hence pneumothorax warrants preventive measures. Mechanical ventilation is said to raise the incidence of pneumothorax in neonates and such incidence varies widely. Watkinson and Tiron reported that 8.7% ventilated neonates developed at least one episode of pneumothorax during the first two weeks of life.2

It is studied that, mortality among ventilated newborns with pneumothorax is witnessed to be nearly twice that of neonates without pneumothorax. This sort of increased mortality is at least partly related to pneumothorax than solely to comorbidities.3 Co - morbidities included persistent pulmonary hypertension (PPHN) in two and one case each of sepsis, pulmonary hemorrhage, and intraventricular hemorrhage. It is likely that pneumothorax have some association with PPHN and IVH too. Pinpointingthe risk factors for pneumothorax in ventilated neonates may decline mortality and improve long - term outcome among survivors if subsequent air leak is hindered.4

The findings positively reinforce an earlier statement that an apparent need to re - intubate or bagging procedures in ventilated neonates must be accompanied by a prompt search for a pneumothorax.5

In view of sepsis, treatment using antibiotics were optimized according to the culture as required for which the baby responded well as it was evident with the repeat sepsis screening report turning out to be negative and sterile.

Concerned with hyperbilurubinemia, Oral Phenobarbitone 5mg/kg/day in two divided doses were ordered for continuing till further review. The selection of phenobarbitone is based on the evidence which directs us to the scenario resulting in decrease trend of the need of exchange transfusion and duration of phototherapy.

Systematic and stepwise approach in treating the baby's ailments resulted in the discharge in stable condition with multivitamins and prophylactic dose of phenobarbitoneas discharge medications.

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Declarations

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- Ethical approval: Not required

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