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A Retrospective Study of Bilateralpneumothorax in Neonates at a Tertiary Care Centre.

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ABSTRACT: Pneumothorax is defined as air or gas in the pleural cavity, which can impair oxygenation and/or ventilation. Neonatal pneumothoraces are associated with high mortality. Prompt recognition to minimize its complications is paramount for the outcome of these babies.
Keywords: Neonatal pneumothorax, respiratory distress, mechanical ventilation.

I. INTRODUCTION:

Pneumothorax is the dissection of air into pleural space thus sufficient occupation of air can cause tension pneumothorax [1]. Although sometimes asymptomatic, it can cause acute deterioration of the neonate. Pnemothorax is more frequent in neonatal period than any other time in life [2].

Incidence and risk factors: Asymptomatic Pneumothorax usually unilateral is estimated to occur in 1-2% of all newborns infants. Symptomatic occurs in 0.08% all live births and 5% to 7% in infants with birth weight less than 1500g [3]. Incidence of pneumothorax increases in infants who received assisted ventilation of NFV and IPPV; lung disease such as Meconium aspiration syndrome, respiratory distressand in infants with urinary tract anomalies such as oligohydramnios [3,4].

Pathophysiology:most of the causes of Pneumothorax are over distension resulting alveolar rupture. Alveolar over distension can occurs with positive pressure ventilation during neonatal resuscitation with ball valve phenomenon that results from aspiration (classically Meconium) and bronchial destruction. Pneumothorax associated with pulmonary hyperplasia is common and tends to occur during 1st few hours after birth and is caused by reduced Alveolar surface area and poorly compliant lungs. Tension Pneumothorax occurs if an accumulation of air within the pleural space is sufficient to elevate intrapleural pressure above atmospheric pressure.[4]

Materials and Methods:a retrospective case series study was carried at Pravara institute of Medical sciences, Loni from November 2019 to august 2020 to know morbidity and mortality associated with B/L pneumothorax; their outcome and to know better mode of O_2 therapy. It included all the neonates admitted to our hospital with respiratory distress whereas babies presenting with unilateral pneumothorax were excluded.

Caseseries:

Case1:

G5P3L1 D1 A1/ full term/ LSCS (fetal distress)/2kg/SGA/delayed cry/ meconium stained liquor (thick).Baby has been resuscitated and intubated and kept on BIPAP mode as there was no spontaneous respiration. At 6 hours of life, baby was not maintaining saturation and distress also increased, so DOPE test was done which came out to be positive with transillumination on right side. ICD tube inserted after confirming pneumothorax with x-ray followed by which baby had repeated episodes of posturing in between to which phenytoin and phenobarbitone was administered and the distress reduced. After12 hours, baby developed pneumothorax on left side for which again ICD was inserted on left side. Later baby developed complications of HIE due to which it could not survive.

Case 2:

Primi/34 week preterm/LSCS/ oligohy dramnious/2 kg/cried immediately was admitted due to prematurity and respiratory distress and was kept on cPAP for respiratory support. Baby

developed sub costal and intercostals retractions along with audible grunting& nasal flaring.X-ray was suggestive of B/L pneumothorax and hence, ICD tube was inserted on both sides along with broad spectrum antibiotics. Baby was ventilated as spo2 was not maintained. Baby died due to sepsis.

Case 3:

Primi gravid/full term/ LSCS due to non-progression of labour/cried immediately/male/birth weight 3.1kgwith PV leak more than 18 hours admitted with % respiratory distress and was kept on CPAP as sub costal and intercostals retractions were seen. There was deterioration of the patients condition following which X-ray was done which was suggestive of extensive bilateral pneumonia for which baby was started on oxygen therapy by CPAP and antibiotics. Transilluminationtest was positive on left side and ICD was inserted. By evening baby developed Pneumothorax on other side also which was also releaved by ICD insertion. Antibiotics were upgraded and ICD was removed on 3rd day and baby was discharged on 14th day of life.

Case 4:

Primi/Preterm (34 weeks)/ vertex vaginal/ Male/ Birth weight of 2.1 kg was admitted with respiratory distress and was kept on CPAP and started on antibiotics as X-ray was suggestive of Congenital Pneumonia. Distress did not settle even after 10 hours of life so transillumination was done which was bilaterally positive and x-ray confirmed bilateral pneumothorax. Pneumothorax was treated by inserting ICD on both sides. Soon pneumothorax got resolved and baby was discharged on 14 the day of life.

Case 5:

Baby was operated on 2nd day of life for tracheoeshophageal fistula under general anaesthesia and extubated and shifted to NICU. Initially baby was taken on oxygen therapy by hood box but later on baby developed distress and hence it was given oxygen therapy by PEEP. Few minutes after this baby developed spontaneous B/L Pneumothorax and ICD was inserted along with empirical treatment with antibiotics,later on baby expired due to TEF related complications.

Case 6:

Primigravida/ near term (36 week)/ Male/LSCS / birth weight 2.1 kg / delayed cry was admitted with respiratory distress. After delivery baby has been resuscitated and kept on BIPAP mode of ventilator. After 6 hours of life there was an episode of desaturation and distress has been increased. Transilluminationwas positive i.e B/L Pneumothorax and B/L ICD was placed. Baby got recovered from Pneumothorax and got discharged on 15th day of life.

II. RESULTS:

Six neonates diagnosed radiologically with pneumothoraces were considered for the study, in which male preponderance was found, with birth weight ranging from 1.8kgs to 3.1kgs with a mean of 2.183kgs. The term to preterm ratio came to around 2:4 with majority of delivered via low section caesarean section. Out of the total babies ventilated, 25% survived whereas in non-ventilated babies 100% survival was found.

The pneumothoraceswhich were predominantly of bilateral in occurrence was considered for the study. Primary etiology included pneumonia, hypoxic-ischemic encephalopathy, meconium aspiration syndrome, and spontaneous pneumothoraces. All the pneumothorax were bilateral pneumothorax with etiology including pneumonia (33%), post - resuscitation and Meconium aspiration syndrome (33%); Spontaneous with renal anomalies (16.6%), Post-operated case of trachea- oesophageal fistula (16.6%). Survival rate 50% according to our study.

The incidence of neonatal pneumothoraces was 2.4/1000 births in our study compared to 2.5/1000 in the Omani study, 10-15/1000 in Denmark, 10-20/1000 in Turkey, and 6.3/1000 from Vermont Oxford Group. Mortality was 50% determined mainly by the primary etiology and other comorbid conditions.

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Table 1: Tabulated details of the cases of pneumothorax along with risk factors and outcome.

IPD	Gravida	Gestation	Type of delivery	sex	weight	Risk factors	ventilated	CPAP	Outcome
1883220	G5	Full term(38wk)	LSCS	M	2kg	Fetal distress Meconium aspiration Ventilation	yes	No	expired
361719	G1	Preterm (31wk)	LSCS	M	2kg	Oligohydramnious. Prematurity Respiratory distress Ventilator	yes	yes	expired
1928820	G1	Full term(40wk)	LSCS	M	3.1kg	Respiratory distress with pneumonia	no	yes	survived
1988320	G1	Preterm (34wk)	Vaginal	M	2.1kg	Respiratory distress with pneumonia	no	yes	Survived
1016120	G1	Preterm (35wk)	LSCS	F	1.8kg	Respiratory distress Post operated TEF	yes	yes	Expired
1819020	G1	Near term	LSCS	M	2.1kg	Post resuscitation Birth asphyxia	yes	yes	survived

With our study we get to know that Risk factors like positive pressure ventilation; meconium aspiration syndrome; post resuscitation has high mortality than Pneumonia.

III. DISCUSSION:

Intensive care treatment modalities have become increasingly dependent on positive pressure ventilation; central venous catheter placement and other causes that are potentially induce iatrogenic pneumothorax [4]. It is relatively common among neonates who have variety of lung disease such as meconium aspiration; lung hypoplasia; disorders of reduced amniotic fluid volume such as renal agenesis and decreased breathing movements like neuromuscular disease; oligohydramnios [5,6].

Neonatal Pneumothorax is a major cause of acquired displacement of heart .It is relatively more common in preterm especially if they are ventilated although recent advances in ventilatory management of preterms seem to have reduced incidence. Most small Pneumothorax resolve spontaneously; but larger and tension Pneumothorax require evacuation of the air in pleural cavity [6,7,8]. Bilateral Pneumothorax is very rare. Usually present with distress should be detected and treated promptly. In our study those who were on CPAP recovered slowly and who were ventilated had poor outcome. Thus Positive pressure ventilation is a risk factor.

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IV. CONCLUSION:

1. Bilateral pneumothorax associated with high mortality. But considering our study, we can reduce mortality with prompt management in case of pneumonia and post resuscitation.
2. Double oxygen therapy by hood box is a better mode of oxygen therapy than mechanical ventilation or CPAP in case of pneumothorax.
3. Pneumothoraxas a post-operative complication of trachea-oesophageal fistula has poor prognosis.

Figures:A- Chest X-ray showing air in the pleural space s/o Bilateral pneumothorax.
B- Post ICD insertion Chest X-ray. C- Clinical picture showing Double ICD tubes
D- Clinical sign of trans-illumination positive seen in B/L pneumothorax

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