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Assessing Respiratory Distress in Late Preterm Neonates: A Cross-Sectional Study in a Tertiary Care Hospital

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Abstract: ***The rising occurrences of late preterm deliveries underscore the need to assess the specific challenges faced by infants born during this period. However, there is insufficient data on the short-term complications experienced by these neonates in the current study setting. Therefore, the study seeks to investigate respiratory distress in late preterm neonates in a tertiary care hospital. A cross-sectional study was undertaken involving 100 late preterm neonates admitted to the Neonatal Intensive Care Unit (NICU) due to respiratory distress. Subsequently, these infants were monitored to assess short-term outcomes, considering both the duration of hospital stay and mortality. The distribution of gestational ages among neonates was as follows: 35%, 38%, and 27% were born at 34 weeks, 35 weeks, and 36 weeks, respectively. A majority of the infants were male, accounting for 55% of the total. Abnormal chest x-ray findings were noted in 82% of the neonates. The predominant diagnoses included transient tachypnea of newborns, early-onset sepsis, respiratory distress syndrome, meconium aspiration syndrome, birth asphyxia, and congenital heart disease. Hospital stays for 47% of the neonates ranged from 8 to 15 days, while 39% and 14% stayed ≤7 and >15 days, respectively. Mortality was observed in 19% of the neonates. Deciding to induce delivery in the late preterm period is a crucial factor in shaping the prognosis for newborns. It requires a careful assessment of both the potential benefits and risks, as a judicious decision can greatly impact the well-being of the infant. Consequently, prolonging pregnancy to a minimum of 36 weeks is anticipated to play a significant role in reducing the severity of respiratory morbidity.***

Keywords: Late preterm deliveries, Neonatal respiratory distress, Respiratory morbidity

1. Introduction

Late preterm infants (gestational age range of 34 to 36 weeks) constitute a unique subset among premature neonates. Despite being overshadowed by the larger population of extremely preterm newborns, this demographic warrants attention due to inherent vulnerabilities arising from anatomical and physiological immaturity.[1] Neonates born late preterm, constituting around 75% of infants delivered before 37 weeks of gestation are prone to elevated risk of mortality and morbidities that impact nearly every organ system, surpassing the risks observed in term neonates.[2] A notable proportion of neonates necessitating admission to the Neonatal Intensive Care Unit (NICU) are primarily late preterm infants, often due to respiratory issues.[3] Respiratory distress stands out as a prevalent cause for NICU admission in infants. Research indicates that 15% of term infants and 29% of late preterm infants admitted to the NICU experience substantial respiratory morbidity. [4]

Various factors contribute to the heightened risk of neonatal respiratory diseases, including but not limited to respiratory distress syndrome, intermittent newborntachypnea, meconium aspiration syndrome, air leakage, pulmonary hemorrhage, pulmonary edema, and congenital structural lung or thoracic deformities. Additionally, non-respiratory causes such as asphyxia before birth, metabolic acidosis, hypoglycemia, polycythemia, cardiac abnormalities, and various inborn metabolic disorders can also lead to respiratory distress in neonates.[3, 5] Clinical symptoms indicative of respiratory distress in newborns encompass apnea, cyanosis, expiratory grunting, inspiratory stridor, nasal flaring, poor feeding, and tachypnea (characterized by a respiratory rate exceeding 60 breaths per minute). [6, 7] Objective scoring methods, such as the Downes score for term newborns and the Silverman-Anderson scoring system applicable to both term and preterm infants, offer a systematic approach to assessing the severity of respiratory distress. The initial evaluation of respiratory distress involves monitoring vital parameters, including SPO2, conducting a comprehensive general physical and systemic examination to rule out non-respiratory causes, obtaining a chest X-ray, assessing blood sugar levels, conducting a full blood analysis, and evaluating the sepsis screen. It is advisable to place a nasogastric tube before a chest X-ray to rule out anatomical abnormalities like tracheoesophageal fistula.

Failure to promptly detect and address respiratory distress can lead to respiratory failure and cardiopulmonary arrest. Early diagnosis and intervention play a crucial role in reducing the morbidity and mortality associated with respiratory distress in newborns. [8] With the increasing prevalence of late preterm births, understanding the specific challenges faced by this demographic is more critical than ever. Despite this, there is a paucity of data on the occurrence of respiratory distress in late preterm infants. Therefore, the current study was conducted to investigate respiratory distress in late preterm neonates within a tertiary care hospital.

2. Material and method

The present cross-sectional study was conducted at a tertiary care hospital after institutional ethical committee approval. The study enrolled a cohort of 100 late preterm neonates experiencing respiratory distress who were admitted to the NICU during the designated study period. Informed consent was obtained from the parents of the infants participating in the study. Whereas, newborns with significant congenital anomalies such as tracheoesophageal fistula and VACTER anomalies were excluded from the research.

During the study period, the occurrence of respiratory distress in late preterm infants was assessed. These infants were continuously monitored for signs of respiratory distress, utilizing the Silverman score. The duration of the need for assisted ventilation was noted, and the diagnosis of respiratory distress was established through a comprehensive analysis of clinical, laboratory, and radiological reports. Subsequently, these neonates were followed up to evaluate short-term outcomes, considering both the duration of hospital stay and mortality.

Statistical Analysis:
The data was collected using a pre-designed proforma and entered into Microsoft Excel for analysis. Continuous variables were presented as mean ± standard deviation (SD). Categorical variables were represented as percentages and frequencies.

3. Results

The delivery method for the majority of neonates was lower segment cesarean section (70%). Meconium-stained liquor was observed in 12% of cases. The distribution of gestational ages was 34 weeks for 35%, 35 weeks for 38%, and 36 weeks for 27% of neonates. The majority of babies were male, constituting 55% of the total. Birthweight analysis indicated that 69% of infants fell within the range of 1.51-2 kg, followed by 18% with ≤1.5 kg and 13% with >2 kg birthweight. Resuscitation was required for 18% of neonates. Abnormal chest X-ray findings were noted in 82% of neonates, with prominent perihilar streaking being the most common finding (46%). Echocardiography (ECHO) revealed total anomalous pulmonary venous connection and transposition of the great arteries in 1% of patients, respectively. (Table 1).

Table 1: Distribution of subjects according to chest x-ray findings

Chest X-rayfindings	Percentage (%)
Prominent perihilar streaking	46
Cardiomegaly,plethoric lungfields	2
Bilateral hyperaeration & coarse nodularopacities	13
Bilateral reticulogranular pattern	4
Air bronchogram	16
Oval-shapedheartwitha narrowbase	1
Total	82

The predominant diagnoses among the neonates were transient tachypnea of newborns followed by early onset sepsis, respiratory distress syndrome, meconium aspiration syndrome, birth asphyxia, and congenital heart disease (Figure 1).

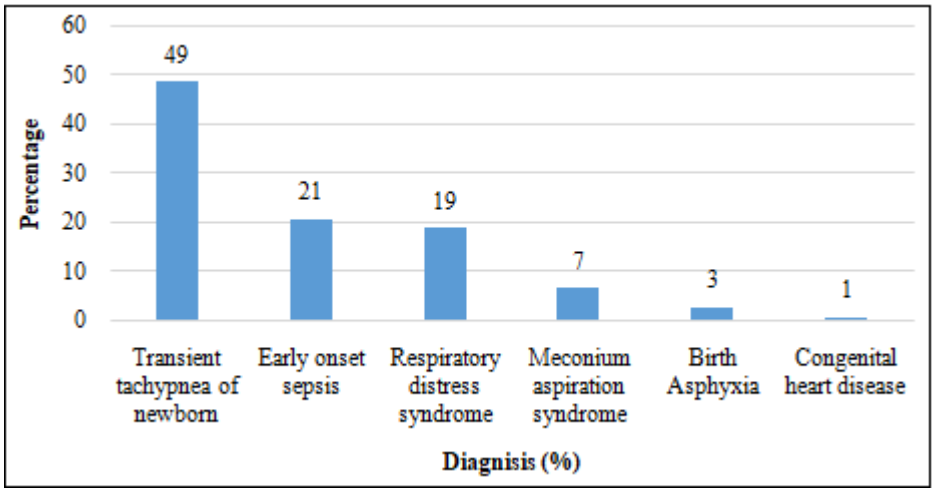

Figure 1: Distribution of subjects according to diagnosis

The administration of oxygen varied among newborns in the study, with nasal prongs being the primary method for 48% of infants, followed by ventilation for 35%, and bubble continuous positive airway pressure for 17%. Surfactant was deemed necessary for 27% of newborns. Regarding the duration of hospitalization, 47% of neonates stayed for a period ranging from 8 to 15 days, while 39% had a hospital stay of seven days or less, and 14% required more than 15 days in the hospital. The study observed a mortality rate of 19% among the neonates.

4. Discussion

The study was intended to investigate respiratory distress in late preterm neonates in a tertiary care hospital. In our study, late preterm neonates experiencing respiratory distress were predominantly delivered via cesarean section, aligning with findings by Shaikh et al.[9] This might be attributed to the retention of lung secretions typically expelled during vaginal delivery and the rapid transition during cesarean section hindering neonatal adaptation to the new environment.

We observed a higher incidence of respiratory morbidity in neonates with lower gestational age, echoing findings by Shaikh et al. [9] and Correia et al., highlighting the inverse relationship between gestational age and the severity of respiratory morbidity. Additionally, our study noted a higher prevalence of respiratory distress in male neonates, consistent with observations by Anadkat et al. [12] and Seaborn et al., who suggested that male babies are more likely to develop respiratory distress due to potential fetal androgens inhibiting surfactant synthesis.

X-ray findings in our study commonly included prominent perihilar streaking, air bronchogram, and bilateral hyperaeration with coarse nodular opacities. Transient tachypnea of the newborn was the most frequent diagnosis, followed by early onset sepsis, respiratory distress syndrome, meconium aspiration syndrome, birth asphyxia, and congenital heart disease. Nasal prongs were the primary oxygenation method, and the majority of neonates required hospital stays of 8-15 days. The mortality rate was found to be 19%, indicating the necessity for more aggressive management and ventilator support in late preterm babies with respiratory distress.

Existing literature emphasizes the considerable morbidity and mortality in late preterm infants, emphasizing the importance of prolonging pregnancy until 36 completed weeks. Maternal and fetal indications for early delivery must be critically evaluated, weighing the risks and benefits. While our study focused on respiratory morbidity, future research should explore correlations with other morbidities and include long-term follow-up. Limitations of our study include its focus on short-term outcomes and brief duration.

5. Conclusion

The decision to induce delivery in the late preterm period plays a pivotal role in shaping the prognosis for newborns. A careful evaluation of both the potential benefits and risks is essential, as a judicious decision significantly contributes to the well-being of the infant. Therefore, prolonging pregnancy to a minimum of 36 weeks emerges as a crucial factor in substantially reducing the severity of respiratory morbidity.

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