



ORIGINAL RESEARCH PAPER

Neonatology

THE PREDICTIVE VALUE OF OXYGEN SATURATION INDEX AND BASE EXCESS IN THE OUTCOME OF NEONATAL RESPIRATORY DISTRESS: A PROSPECTIVE STUDY

KEY WORDS: Base Excess, Oxygen Saturation Index, Neonatal Respiratory Distress, Risk Stratification, Surfactant Therapy

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ABSTRACT Neonatal respiratory distress is a major contributor to neonatal morbidity and mortality. This study evaluates the predictive value of Oxygen Saturation Index (OSI) and Base Excess (BE) in determining the outcomes of neonates with respiratory distress. In this prospective observational study, 50 neonates admitted to NICU with respiratory distress were assessed. Data on OSI, BE, clinical parameters, and outcomes were analyzed. Higher OSI and more negative BE were significantly associated with severe disease, requiring mechanical ventilation or resulting in adverse outcomes. OSI and BE offer promising tools for early risk stratification and tailored management in neonatal respiratory distress.

INTRODUCTION

Respiratory distress in neonates is a clinical emergency frequently associated with conditions such as respiratory distress syndrome (RDS), transient tachypnea of the newborn (TTN), and pneumonia. Traditional assessment methods like oxygenation index (OI) require arterial blood sampling. However, OSI, a non-invasive surrogate, and BE, a metabolic parameter, are emerging predictors in neonatal care. The study aims to evaluate their utility in predicting adverse outcomes.

MATERIALS AND METHODS

This was a prospective observational study conducted over 18 months at Rajarajeswari Medical College and Hospital, Bengaluru. Fifty neonates aged ≤28 days admitted with respiratory distress were enrolled. OSI was calculated from SpO₂, FiO₂, and mean airway pressure. BE was obtained from capillary blood gas analysis. Outcomes such as type of respiratory support, surfactant use, and mortality were documented. Statistical analysis was performed using SPSS 23.0.

RESULTS

The mean gestational age was 35.3±1.9 weeks and mean birth weight was 1957.3±595.7 g. CPAP was the most common respiratory support (50.9%). Mean OSI was 2.72±1.11 and BE was -7.47±3.07. Higher OSI values significantly predicted need for mechanical ventilation (p<0.05). BE values more negative than -8 correlated with poor outcomes. ROC curves showed OSI and BE to have comparable predictive validity.

DISCUSSION

OSI and BE are practical, non-invasive tools for early identification of high-risk neonates with respiratory distress. This allows for timely escalation of therapy including surfactant and ventilation. Unlike arterial blood-based OI, OSI is derived from pulse oximetry, making it feasible in all NICU settings. BE serves as a metabolic indicator for illness severity. Integration into routine NICU protocols is feasible and beneficial.

CONCLUSION

OSI and BE are reliable predictors of clinical outcomes in neonatal respiratory distress. They assist in risk stratification, early interventions, and resource optimization in NICU care. Their implementation in clinical practice can improve prognostication and individualized management.

RESULTS (Extended)

Figure 1: Distribution of Respiratory Support Types

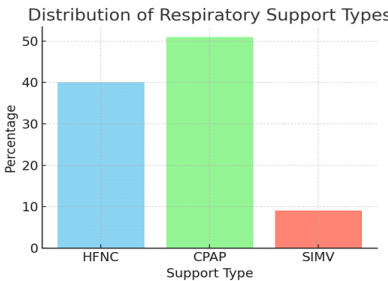


Table 1: Baseline Characteristics of Neonates with Respiratory Distress

Parameter	Mean ± SD	Range
Gestational Age (weeks)	35.29 ± 1.85	32.3 - 39.1
Birth Weight (g)	1957.3 ± 595.71	1140 - 3500
SBP (mmHg)	68.33 ± 4.58	56 - 78
DBP (mmHg)	44.60 ± 7.26	26 - 59
Heart Rate (bpm)	144.85 ± 11.00	120 - 168
RR (breaths/min)	56.18 ± 9.01	38 - 78
SpO ₂ (%)	92.76 ± 4.42	76 - 98

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