



Initiating the use of non-invasive respiratory support following delivery of 27–30 week gestation infants in a Level III NICU



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Abstract Historically it has been common practice to intubate and give surfactant to extremely premature infants. The most recent evidence-based literature has shown this practice results in similar outcomes to infants treated with non-invasive respiratory support (NIRS) with selective surfactant administration following delivery. The need for an evidence-based practice change was identified at Integris Baptist Medical Center-Neonatal Intensive Care Unit (IBMC-NICU) and steps taken to implement new practice following the delivery of extremely premature infants. To date seventeen infants have been managed with the new practice in place. The new practice has resulted in a culture change in the unit leading to more evidence-based changes.

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Introduction

In early 2014, the Committee on Fetus and Newborn released a policy statement on respiratory support in preterm infants following delivery. The committee found after reviewing multiple randomized controlled studies that the use of early nasal continuous positive airway pressure (NCPAP) with the use of early selective surfactant treatment in extremely premature infants resulted in decreased rates of bronchopulmonary dysplasia (BPD) or death when compared to historical practice of intubation with prophylactic surfactant administration at delivery. This evidence-based knowledge led to the introduction of a practice change at Integris Baptist Medical Center-Neonatal Intensive Care Unit (IBMC-NICU). The goals of the practice change were to reduce delivery room intubations, surfactant administration, days on mechanical ventilation, and the incidence of BPD or death in infants 27–30 weeks gestation. In infants between 27 to 30.6 weeks gestation delivered at IBMC (P), does initial management with non-invasive positive pressure ventilation (NIPPV) and treatment with rescue surfactant (I), as compared with historical practice of intubation and surfactant in the delivery room (C), decrease the number of mechanical ventilation (MV) days, and decrease the incidence of BPD (O)?

Historical practice

At IBMC-NICU the practice was to intubate and administer surfactant in the delivery room to premature infants born between 27 to 30 weeks gestation. Neonatal respiratory distress syndrome (RDS) begins after birth and increases in severity over the first days of life. RDS is a disease of pulmonary insufficiency (Sweet et al., 2013, 27). Classic presentation of RDS is cyanosis, grunting, retractions, and tachypnea, if continues untreated the infant will likely die from respiratory failure. Surfactant deficiency has been identified as the primary cause of RDS in premature infants. The use of surfactant in the treatment of neonatal RDS has become the gold-standard for premature infants.

Evidence-based literature

A review of literature reveals that application of early NIRS in the delivery room has comparable outcomes to prophylactic surfactant administration

in the delivery room, making it the preferred mode of respiratory management owing to its less invasive nature. Current research assessing the use of prophylactic surfactant in the delivery room and early NIRS has resulted in improved long-term outcomes in extremely low birth weight (ELBW) infants.

A study performed by Sandri et al. (2009) concluded that early management with NCPAP over early prophylactic surfactant resulted in improved outcomes in premature infants. Researchers stated the need for further study specifically regarding prophylactic intubation, surfactant, extubation method (InSurE) versus early selective InSurE. Sandri et al.'s (2009) research promotes the initial management of respiratory needs in the ELBW infants with NCPAP.

Rojas et al. (2009) investigated the implementation of the immediate use of NCPAP with early surfactant treatment for ELBW infants. Their research concluded that the need for subsequent MV was decreased in the group treated with early surfactant. The researchers did consider the need for additional research concerning trauma caused by intubation for surfactant administration.

Finer et al. (2010) observed no substantial outcome differences in ELBW infants managed with early NCPAP and limited exposure to MV versus early surfactant administration occurring in the first hour following birth; thus, supporting the idea that even 24–27 week infants may do as well with NIRS when compared to prophylactic surfactant and MV. The researchers discovered an increased need for intubation and surfactant administration in infants randomly treated with NCPAP, but this was an anticipated result due to the extremely premature nature of the infants involved.

With the current literature available it is evident there remains a need for additional research regarding the different treatment modalities to evaluate the long-term outcomes of ELBW infants. The need for change at IBMC-NICU was evident. Utilization of current evidence-based research was used to implement practice change.

Implementation of practice change

All inborn infants between 27 to 30 weeks with spontaneous respiratory drive were managed with non-invasive respiratory support (NIRS) in the delivery room. In infants lacking a respiratory drive the existing practice was utilized. A flow chart (Fig. 1) was developed and used to define practices

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