High-Risk related to Respiratory Distress Syndrome

In Newborn Infant

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Respiratory Distress Syndrome (RDS)

A disease related to developmental delay in lung Maturation and condition of surfactant deficiency .Seen almost exclusively in preterm infants and seen in infants <32 wks .

- **Surfactant:** A fluid secreted by the cells of the alveoli (the tiny air sacs in the lungs) that serves to reduce the surface tension of pulmonary fluids; surfactant contributes to the elastic properties of pulmonary tissue.
- In more technical terms, a surfactant is a surface active agent, the best known example being the lung surfactant that is produced shortly before birth and makes the alveolar surfaces hydrophobic and prevents the lung from filling with water.

- Also associated with multifetal pregnancies,
- infants of diabetic mothers,
- Caesarean Section delivery,
- delivery before 37 weeks,
- low birth weight,
- cold stress,
- asphyxia,
- history of chronic intrauterine stress .

- **Pathophysiology**
  Preterms are born with underdeveloped alveoli ;Limited pulmonary blood flow; Collapsed lungs; Increased pulmonary vascular resistance .
- Fetal Lungs deficient in **surfactant** due to immaturity of surfactant producing **type 2 alveolar cells**
- **Surfactant**
- **– 1st produced at 24 wks AOG, type 2 cells do not fully mature until about 36 wks AOG**
  Reduces surface tension of fluids that line the alveoli & uniform expansion and maintains lung expansion and respiratory passages

- **Clinical manifestation**
- Tachypnea (≤80 to 120 breaths/min) initially*
  Dyspnea
  Pronounced intercostal or substernal retractions (Fig. 9-20)
- Fine inspiratory crackles
  Audible expiratory grunt
  Flaring of the external nares
  Cyanosis or pallor

- *Not all infants born with respiratory distress syndrome manifest these characteristics; very low–birth-weight and extremely low–birth- weight infants may have respiratory failure and shock at birth because of physiologic immaturity.

- **Management:**
- Immediate establishment of adequate Oxygen and ventilation and supportive measures required for a preterm, prevent further complications .

- Supportive Measures(Maintain acid-base balance; neutral thermal environment; adequate hydration) .

- Parenteral therapy during 1st phase of disease recommended (Nipple and gavage feedings are contraindicated).

• Therapeutic Management

- Maintain adequate ventilation and oxygenation.
- Maintain a neutral thermal environment.
- Maintain adequate tissue perfusion and oxygenation.
- Prevent hypotension.
- Maintain adequate hydration and electrolyte status.
- Nipple and gavage feedings are contraindicated in any situation that creates a marked increase in respiratory rate because of the greater hazards of aspiration.
- Nutrition is provided by parenteral therapy during the acute stage of the disease, and minimal enteral feeding is provided to enhance maturation of the neonate's gastrointestinal system.

• Therapeutic Management

The administration of **exogenous surfactant** to preterm neonates with RDS has become an accepted and common therapy in most neonatal centers worldwide.

- Surfactant may be administered at birth as a preventive or prophylactic treatment of RDS or later on in the course of RDS as a rescue treatment; however, research has demonstrated improved clinical outcomes and fewer adverse effects when surfactant is administered prophylactically to infants at risk for developing RDS .

- **Prevention**
- The most successful approach to prevention of RDS is prevention of **preterm delivery**.
- The combination of maternal steroid administration before delivery and surfactant administration postnatally seems to have a synergistic effect on neonatal lungs, with the net result being a decrease in infant mortality, decreased incidence of intraventricular hemorrhage, fewer pulmonary air leaks, and fewer problems with pulmonary interstitial emphysema and RDS .

- **Prognosis**
- Respiratory distress syndrome is a self-limiting disease. Before the use of surfactant, infants typically experienced a period of deterioration (≈48 hours) and, in the absence of complications, improved by 72 hours.
- Infants with RDS who survive the first 96 hours have a reasonable chance of recovery.
- However, complications of RDS include associated respiratory conditions and problems associated with prematurity.

Nursing Care Management

- Care of infants with RDS involves all of the observations and inter-ventions previously described for high-risk infants. In addition, the nurse is concerned with the complex problems related to respiratory therapy and the constant threat of hypoxemia and acidosis that complicates the care of patients in respiratory difficulty.

- The respiratory therapist, an important member of the NICU team, is often responsible for the maintenance of respiratory equipment.

- Although it may be the respiratory therapist's responsibility to regulate the apparatus, nurses should understand the equipment and be able to recognize when it is not functioning correctly.

- **Nursing Care Management**

- The most essential nursing function is to observe and assess the infant's response to therapy.
- Continuous monitoring and close observation are mandatory because an infant's status can change rapidly and because oxygen concentration and ventilation parameters are prescribed according to the infant's blood gas measurements and pulse oximetry readings.
- Mucus may collect in the respiratory tract as a result of the infant's pulmonary condition.
- Suctioning should be performed only when necessary and should be based on individual infant assessment.

Any questions?