Respiratory System



Introduction:

The Neonate's respiratory system is compromised when born early due to an immaturity of the system and their breathing control due to the infant's airway being much smaller and not fully developed, which can result the surfactant in an infant's lungs being reduced causing respiratory distress syndrome (RDS) (Akers & Gorley-Fleming, 2015). Surfactant is a substance within the alveolar fluid, which can help to prevent the alveoli from collapsing due to reducing surface tension. Through the infant having enough surfactant within the respiratory system it can help manage RDS (Sweet et al, 2023). Tortora & Derrickson (2014) explains that through providing surfactant to the neonate it can also help improve their overall respiratory system after birth, it must be decided within the first hour of also known as the Golden Hour.

A neonate in respiratory distress may show signs such as grunting, tachypnoea, head bobbing, and intercostal recession (Akers & Gorley-Fleming, 2015). These signs can show medical professionals that the baby may require respiratory support to help increase oxygen levels within the body and with their overall breathing. There are different types of respiratory support within the Neonatal unit, this includes Ventilation, BiPAP ventilation, continuous positive airway pressure (CPAP), Opti flow, and low flow nasal cannula.

Background:

Premature neonates are at greater risk of requiring respiratory support due to there underdeveloped respiratory system Chan et al (2020) explains that the use of respiratory support is key to reduce the risks of chronic lung disease, to help with surfactant deficiency and lung clearance as well as aiming to improve the neonate's development and outcome. The first hour within the Neonatal unit is the most important, this is called the 'Golden Hour', Sharma (2017) explains that respiratory support is a key component within the management of the first hour of care to improve the infant's overall outcome. Respiratory support that is provided within the golden hour is ventilation or CPAP to achieve the required levels of gas in the lungs after exhaling, when providing this support, the neonatal team must watch the neonate's oxygen saturations, respiration rate, respiratory effort, chest movements and the heart rate (Sharma, 2017). Boyle (2019), explains that the neonate is faced with many different respiratory difficulties when premature which can result in respiratory support being required, these conditions include Respiratory distress syndrome in the first four hours of their life, Bronchopulmonary dysplasia which is a long-term effect caused by the fluid in the lungs reabsorption and clearance becoming delayed and pulmonary haemorrhage which is caused by trauma within the respiratory system.

When providing respiratory care for the neonate the nurse must inform parents and carers of the care that is being provided. The National Institute for Health and Care Excellence (NICE), (2019) recommends that the nurse shares information of changes to care with the parents ensuring that this is through the parents chosen contact method, also encouraging parents to attend ward rounds to ask questions and to take part in cares such as nappy changes and feeding.

Supporting the baby's respiratory system and implementing respiratory support within the neonatal unit. - Bethany Ellis

Advantages:

- Through using respiratory support, it offers support for the baby's respiratory system to mature and continue developing.
- Parents are still able to carry out cares with their baby such as changing a nappy or carrying out feeds (NICE, 2019).
- Parents are encouraged to regularly do skin to skin with their babies at any gestation especially when on respiratory support as this can help regulate breathing and heart rate of the neonate (Robyn, 2017).
- NICE (2019), recommend continuous positive airway pressure (CPAP) to be used over the use of ventilation due to the increased risks of trauma that can be caused by ventilation however, the medical practitioners must decide what is best for each baby.
- Through using nasal high flow (Optiflow), it helps protect the neonate's skin around their nose due to the trauma that CPAP can cause, due to High flow being given through a nasal cannula it can also help to increase the neonates comfort (Roberts & Hodgson, 2017).

Challenges:

- Parents may feel scared when holding their baby, if this occurs the nurse's role is to help support the parents with handling the baby and offering help if parents are worried for example about taking their baby out of the incubator while on respiratory support.
- The neonate may require extra support for example going from Opti-flow to CPAP. This can cause stress on families because of the thought of their child taking steps back with the care being provided.
- Oxygen can cause damage to a neonate's eyes requiring mouth care and skin assessments to be carried out every 4-6 hours as well as oxygen intake due to the increased risk of developing retinopathy of prematurity (ROP) (Hartnett & Lane, 2013).
- Invasive Ventilation and Mechanical ventilation can cause harm due to a baby potentially becoming dependent due to not breathing independently as well as potential trauma that can be caused to the trachea and lungs through intubating and extubating (NICE, 2019).



Key Learning Points:

When providing respiratory support, it can cause conflict due to multi-disciplinary teams working together and potentially not fully communicating with each other or with parents.

To overcome this nurses can:

- Appropriately support parents with children receiving respiratory support.
- Closely monitor the neonate's development and how the neonate is responding to the support.
- Include parents within decision making and in discussions about care plans and how the neonate is responding to the respiratory support.

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Images:

Figure 1. Rajendra, P, A., & Srinivas, M. <u>Noninvasive Respiratory Support in Neonates: A Review of</u> <u>Current Evidence and Practices | SpringerLink</u>

Children's hospital of Philadelphia. <u>The Respiratory System in Babies | Children's Hospital of</u> Philadelphia (chop.edu)