

Prevention of ROP :

Role of neonatal team including Nurses

MAJID MAHALLEI MD

NEONATOLOGIST

TABRIZ UNIVERSITY OF MEDICAL SCIENCES

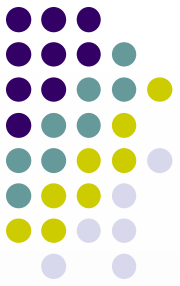
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ROP



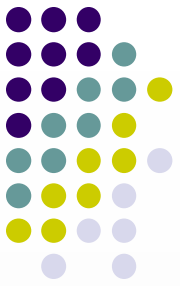
- **Retinopathy of Prematurity (ROP) is a preventable cause of blindness in children**
- **As smaller and sicker neonates are surviving in the neonatal intensive care unit (NICU), the incidence and severity of ROP is also on the rise.**

Incidence of ROP



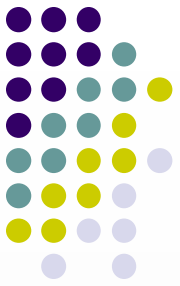
- **Incidence of ROP varies considerably between different intensive care neonatal units, even those with similar characteristics in terms of the equipment and clinical staff available.**
- **Routinely implementing standard interventions that are known to prevent ROP will improve outcomes.**

Preventing ROP before delivery



- Use of **prenatal steroids** is a well-known approach to prevent *respiratory distress* and *intraventricular hemorrhage*, two important risk factors of ROP.
- All women expected to deliver between 24 to 34 weeks of gestation should be given a course of either betamethasone or dexamethasone intramuscularly at-least 24 hours before the delivery of the baby.

Risk factors for ROP



- The main risk factor for ROP is **prematurity**, but this is difficult to prevent.
- other factors such as exposure to too much **oxygen**, **infection**, and **poor weight gain** after birth also increase the risk.

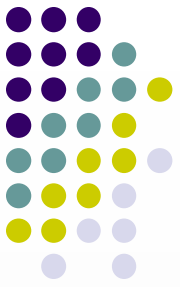
Risk factors for ROP



➤ Controlling these factors requires high quality neonatal care, which can be summarised as POINTS of Care:

- **P**ain control
- **O**xygen management
- **I**nfection control
- **N**utrition
- **T**emperature control
- **S**upportive care

Preventing ROP during the first hour after preterm birth



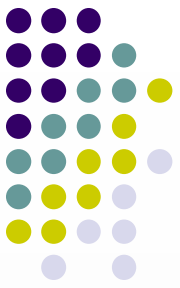
- The first hour of life has been called the ‘**golden hour**’ because several low-cost interventions greatly improve outcomes

Labour ward and delivery room interventions



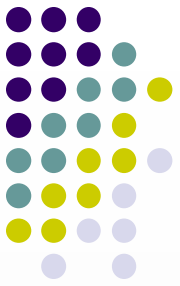
Intervention	Explanation
Antenatal corticosteroids for preterm births (< 35 weeks' gestation)	Reduces mortality, the severity of respiratory distress and other complications
Delay clamping the umbilical cord by 30–60 seconds in vigorous preterm infants	Decreases some complications (IVH, NEC) and reduces the need for blood transfusion
Keep preterm babies warm. Use a plastic bag or occlusive wrapping (Figure 2, p. 54)	Maintaining normal temperature (36.5–37.2° C) reduces the risk of severe ROP and other complications
Gentle respiratory management	This avoids injury to the lungs. Most newborns are not pink at birth. If they are breathing well, the colour will improve in 5–10 minutes

Labour ward and delivery room interventions



- Giving 100% **oxygen** is not necessary for most preterm babies.
- Ideally, there should be equipment to mix air and oxygen (**blenders**) in the delivery room.
- Preterm infants <35 weeks should receive ventilation with a bag and mask and **21-30% oxygen**
- If the baby is not breathing well, or the heart rate is dropping, the concentration of oxygen given can be increased to 100% and then reduced as soon as possible.

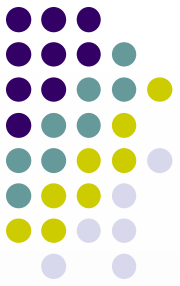
Target oxygen saturation levels (SpO₂) in preterm infants during the first 10 minutes after birth



Time after birth	Oxygen saturation* (range)
2 min	55–75%
3 min	65–80%
4 min	70–85%
5 min	80–90%
10 min	85–95%

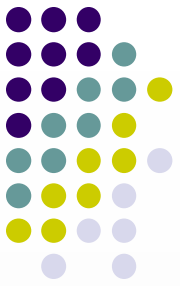
*The proportion of haemoglobin in arterial blood that is carrying oxygen

Preventing ROP in the neonatal unit: POINTS of Care

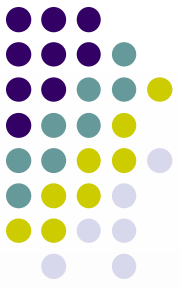


- Prevention of ROP includes **improved care** in the NICU. Improved care results in reduced morbidities and reduced risk factors that put a neonate at-risk for developing ROP.
- Any intervention to improve quality care of a newborn can contribute to reducing the incidence of ROP in developing countries.
- Many of these '**POINTS of Care**' help to keep babies stable and **reduce wide fluctuations in blood oxygen** levels so that extra oxygen is not needed.

Pain



- **Pain** makes babies unstable. It can *increase the need for oxygen and worsen respiratory distress.*



Judicious oxygen therapy

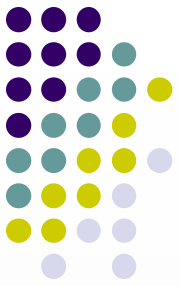
- Oxygen is a **drug** and it should be administered in a quantity that is appropriate to the need.
- Oxygen level in the blood should be continuously monitored using a **pulsoximeter**.
- In preterm babies, an **SpO₂ of 95–100% can damage** developing blood vessels in the retina, leading to ROP, and can damage the lungs and brain.
- A **low SpO₂** can also lead to **brain damage**. Careful administration and oxygen monitoring from immediately after birth are therefore essential in preterm babies.

Oxygen...



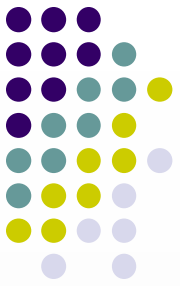
- A **target of 90-95% SpO2** in all newborns on any respiratory support, including oxygen therapy, should be maintained
 - *Askie LM, Darlow BA, Davis PG et al. Effects of targeting lower versus higher arterial oxygen saturations on death or disability in preterm infants. Cochrane Database Syst Rev. 2017 Apr 11;4*
- This means that the **alarms** on the monitors should be set at 89% and 96% so that they will sound if the oxygen saturation goes below or above this recommended range.
- It is also important to **avoid fluctuations** in SpO2 especially at high levels.

Oxygen...



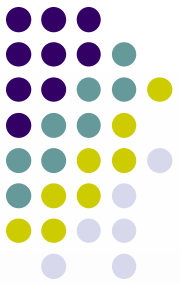
- **Pulse oximeters** are easy to use. They should be used for all preterm infants receiving supplemental oxygen.
- If there is not enough equipment to monitor oxygen levels in all babies, priority should be given to
 - those who are **unwell**,
 - those being **handled**, and
 - those being given **higher concentrations** of supplemental oxygen.

Infection



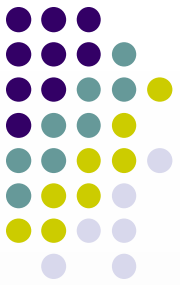
- Neonatal infections, particularly **fungal infections**, are also risk factors for ROP.
- Neonatal **bacteremia** is associated with severe retinopathy of prematurity in extremely low gestational age neonates.
- The increased risk associated with infection might be partly due to **systemic inflammation**, which could act synergistically with hyperoxia.
- **Chorioamnionitis** is often associated with higher levels of circulating proinflammatory cytokines which could act with postnatal infections resulting in **higher cytokines** and later development of ROP.

Infection...



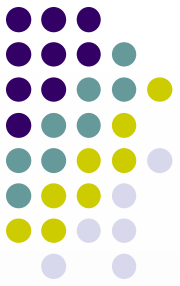
- **Infection** can be reduced by **hand washing** (or alcohol rubs after an initial wash) on entering the NICU and before and after handling each baby
- Measures to **reduce skin breakdown**, **sterile techniques** for intravenous lines, and careful use of **antibiotics** all reduce infection.
- Having an **infection control team**, headed by a senior nurse, is often beneficial.

Nutrition



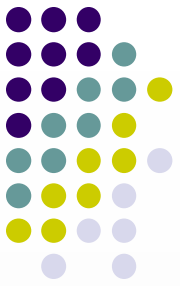
- **Postnatal weight gain** predicts risk of retinopathy of prematurity. Poor weight gain in postnatal period increases the risk of severe ROP.
- **Insulin-like growth factor 1 (IGF-1)** controls VEGF-mediated vascular growth, which is important for retinal vasculature.

Nutrition...



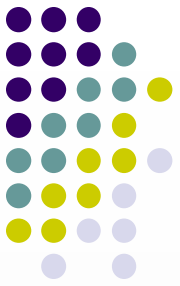
- Some of the interventions in improving the nutritional status of preterm infant:
 - **intravenous feeding** for babies below 1,000 g
 - Early administration of **colostrum**,
 - exclusive and aggressive use of **mothers own milk** or donor milk,
 - human milk **fortification**,
 - **kangaroo** mother care,
 - **mothers involvement** in baby care

Temperature control

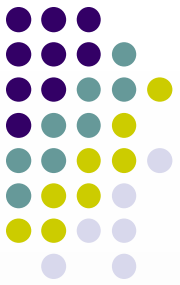


- Both high and low temperatures make babies **unstable** and can increase the **need for oxygen**.
- It can also worsen **respiratory distress**.

Supportive care



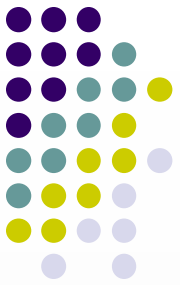
- practices are those which keep babies **comfortable and stable**, including
 - kangaroo care and
 - ensuring that babies' limbs are supported
 - developmentally supportive care
 - Judicious use of blood transfusions



Judicious use of blood transfusions

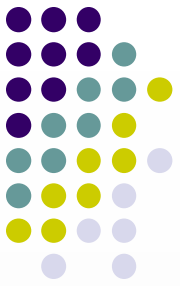
- **Adult haemoglobin** has $\alpha_2\beta_2$ chains and are rich in 2, 3 Diphosphoglyceric acid (DPG), resulting in more release of oxygen to the retinal tissue.
- **Significantly low haemoglobin or platelets** on the other hand can also worsen ROP.
- Hence written guidelines for transfusion in the NICU will help **in restricting adult blood transfusions**.

POINTS of Care

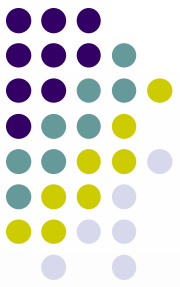


Intervention	Explanation
Pain: Avoid and prevent painful episodes	Reduce unnecessary painful procedures. Anticipate pain and prevent it by swaddling and use of oral sucrose or glucose
Oxygen management	Ensure that the oxygen saturation is between 89% and 94%
Infection control	Apply infection control procedures, including hand washing by all
Nutrition: Improved nutrition with breast milk	Use mothers' own breast milk but provide extra protein and calories
Temperature control	Keep the baby warm from immediately after birth, by wrapping, using a hat and keeping the baby in an incubator, or under a warmer
Supportive care	Includes good positioning of the baby in an incubator or cot and the use of kangaroo care
Other: Minimise blood transfusions	Reduce blood sampling and the volume of blood taken. Blood transfusions have been linked with ROP

Secondary prevention of ROP: early case detection and treatment



- The unit should have protocols that cover all steps of **screening** and management of ROP:
 - The simplest method to ensure that all eligible infants are examined at an appropriate time is to identify them when they are **first admitted** to the NICU.
 - Nurses can help in establishing clear **communication** between neonatologists, resident doctors and ophthalmologist in the NICUs and, importantly, with parents.
 - Nursing staff inevitably spend the maximum time talking to parents. They are often the most trusted members of the team, so their input into written material and how it is presented is vital.



Clinical advocacy

- Nurses are **primary care givers** in a neonatal ICU. They can also advocate for providing best practices in the NICU.

- Some of these include:
 - kangaroo care,
 - thermal care,
 - infection prevention and
 - breastfeeding.
 - adjustment of environmental factors (minimal handling, noise and light) and
 - developmental care

*Thank
You!*

