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Plastic Wrap to Prevent Hypothermia in Neonates: An Overall Review Article

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Abstract: ***Hypothermia in new-borns, which is a serious problem in both developed and developing countries. Heat loss and through evaporation is the main cause of hypothermia in neonates during the first 30 minutes of life. There have been many studies regarding the use of plastic wrap which is estimated to able to reduce heat loss through evaporation and metabolic requirements for heat production. Laying premature newborns or low birth weight on plastic wrap at birth compared to standard thermoregulation treatments can reduce the incidence of hypothermia without causing hypothermia, it is cheap and does not require modern equipment. Safety and effectiveness of using plastic wrap have tested to prevent hypothermia during neonatal resuscitation at neonates.***

Keywords: Plastic wrap, Hypothermia, Neonates

1. Introduction

Hypothermia contributes to neonatal mortality and morbidity, especially in preterm and low birth weight neonates in developing countries. Many interventions can be used for the prevention of hypothermia at birth such as plastic wrap, plastic bag and skin to skin contact.

Who recommends to prevent the occurrence of hypothermia in neonates by making the environment of the maternity room warm, drying directly, and doing resuscitation in radiant warmer, skin to skin contact with mother, or by incubator. Heat loss through evaporation is the main cause of hypothermia in neonates during the first 30 minutes of life. In addition, insensible water loss and immature baby skin also contribute to increasing the risk of hypothermia in neonates. There have been many studies regarding the use of plastic wrap or polyethylene in the delivery room to reduce incidence of hypothermia in low birth weight and very low birth weight.

Plastic is a group of materials. And made up of polymers of just one monomer, but sometimes blends will be used. Plastic wrap is a type of a thin plastic which is made from polyethylene or polyvinyl plastic to prevent hypothermia in neonates. Plastic wrap covering the trunk and extremities of neonates to prevent hypothermia.

Heat produced by the fetus in utero is transferred to the mother through the placenta. At birth the newborn ability to control heat production is not fully developed and the newborn, wet infant almost always experiences an immediate fall in body temperature. Heat loss in the first half hour is largely due to evaporation of amniotic fluid from the neonates body. If the baby is not dried, given to the mother for skin- to- skin contact, and covered immediately more heat will be lost.

Premature newborn who are hypothermic when admitted to the newborn intensive care unit have increased morbidity and mortality; increasing the temperature in the delivery and operating rooms has been found to decrease the prevalence of hypothermia on NICU admission. Thus, the American Academy of Pediatrics and the American Heart Association recommend that delivery and operating rooms where premature neonates are delivered have a temperature of 23 to 25° C. Because rise room temperature only when delivery is expect may allow radiant heat loss to cool surfaces and convective heat loss caused by rapid airflow, the room should be maintained at the recommended temperature continually.

At the time of birth, babies should be immediately dried and then swaddled in a warm blanket to prevent evaporative, conductive, and convective losses. For a premature newborn, placement into a polyethylene bag immediately after delivery has been found to help maintain the newborn temperature; some clinicians do not dry the neonates before place in the bag because the increased humidity may be beneficial

Plastic wrap is an innovative technique use to control hypothermia of newborns in NICU. It is a simple and effective mode that is utilized to maintain normothermia by principle of radiation and convection. It conserves the body heat and retains the ambient external source of heat supplied, as well as preventing the insensible water loss from the newborns. As it is readily available and affordable, requiring minimal efforts in administration along with broad spectrum of benefits in maintaining thermoregulation.

Plastic wrap are an effective cost effective intervention that is shown to significantly improve admission temperature in preterm infants. This technique can be adapted in the delivery rooms of developed and developing countries to improve admission temperatures in extremely premature infants.

After the initial observation, the new-born was wrapped in plastic wrap up to the neck immediately following delivery without dry. The plastic wrap are secured loosely around the neck by the strap. Only the head was dried and covered by a cap and temperature, oxygen saturation, respiration and

heart rate were observed at an internal of about 15 minutes for a period of 6 hourly.

2. Hypothermia

Definition

Hypothermia occurs when the newborn's body temperature drops below 36.5°c generally because the environment is too cold for the baby.

Causes of hypothermia

- The room is too cold
- The baby is exposed to cold draft
- The neonate is wet
- The baby is uncovered, even for short time
- The baby is not feeding well
- The baby has an infection
- Mother and baby are not together
- Baby has birth asphyxia and does not have energy to keep warm.

Signs and Symptoms of hypothermia

- Low temperature
- Poor sucking or feeding
- Week cry
- Slow or shallow respiration
- Slow heart rate
- Hypoglycemia, metabolic acidosis due to decreased metabolism
- Respiratory distress, tachypnea due to increased pulmonary artery pressure
- Chronic signs- weight loss, failure to thrive.

Categories of Hypothermia

- **Mild hypothermia-**When the body temperature of the neonate is between 36°C- 36.5°C.
- **Moderate hypothermia-** When the body temperature of the infant is between 32.0°C-35.9°C.
- **Severe hypothermia-**When the body temperature of the infant below 32.0°C.

Management of Neonatal Hypothermia

The diagnosis of hypothermia is confirmed by recording actual body temperature.

1) **Confirm hypothermia** by recording actual body temperature. A hypothermia baby has to be rewarmed as quickly as possible. The method selected will depend on the severity of hypothermia and availability of staff nurse and equipments. The choice includes Skin- to-skin contact, warm room or bed, a200-watt bulb, a radiant heater or an incubator.
2) **Moderate hypothermia**: Skin- to- skin contact should be in a warm room and warm bed. Warmer or incubator may be used, if available. Continue rewarming till temperature reaches normal range. Monitor every 15 – 30 minutes.
3) **Severe hypothermia:**32 degree use air- heated incubator air temperature 35-36 degree or manually operated radiant warmer or thermostatically controlled heated mattress set at 37- 38 degree. Once baby's temperature reaches 34 degree the rewarming process should be slowed down. Monitor blood pressure, heart rate, temperature, glucose. In addition take measures to reduce heat loss, start IV 10% dextrose, give injectable vitamin vit K (1mg for term baby, 0.5 mg for preterm baby) and provide oxygen.

Prevention of Hypothermia

1) In the delivery room

- Conduct delivery in a warm room.
- Immediately dry the baby with a clean soft preferably warm towel. Useanother warmtowel to cover the baby in two layers.
- Confirm that the head is well protected.
- Retain the baby by the mother's side

2) Skin- to- skin contact

- Assist in maintaining the temperature of infant.
- Facilitate breastfeeding.
- Helps to rise the duration of breastfeeding.
- Improve mother infant bonding.
- Where radiant warmer or incubator is not available, KMC may be the only option. Monitor temperature every ½ hourly till it reaches 36.5 degree Celsius.

3) Procedure of kangaroo mother care

- Place the baby naked, with or without a nappy, upright inside maters apparel against the bare skin over casket. A loose blouse, sweater or serape tied at the midriff holds the baby.
- Let baby nurse at guts as frequently as he wants, but at least every 2 hourly. Mother should sleep properly so that the baby stays upright.
- Make sure the baby stays warm. Cover baby's head with a cap.

4) Bathing the baby

- Bathing incontinently after birth should be avoided, insure ahead giving bath that baby's temperature is normal. Rather bath is given to normal baby on alternate day in summer. In wintertime, bathing may be avoided for several days. Defer bath up to 24 hours in term baby; no bath to babies who are sick admitted in nursery; in small and or low birth weight baby defer bath till the umbilical cord falls off or preferably till the baby's weight reaches 2.5kg.

5) Cot- nursing in hospital (if the mother is sick)

- Adequately clothe the baby.
- Keep ambient atmospheric temperature warm.
- Monitor body temperature often, at least 3 hourlies during the initial postnatal days. In cold weather wrap the baby well but in hot weather conditions use loose clothes.

6) Temperature maintenance during transport

- Continuously steady the baby's temperature before transport.
- We should take remedial measures and record temperature before transport. If temperature can't be documented, use to touch to judge temperature. Hands and feet of new-born should be as warm as stomach.
- Transfer the new-born close to the chest of mother.

- Cover head, legs and hands. Avoidunclothing the infant for cleaning, weighing or checkup. Postpone these until Baby is warm.
- We can use thermocol box with pre warmed linen or silver swaddlerorplastic bubble sheet while transferring the new-born.
- We can use water filled mattress with thermostat to control the temperature while transferring the new-born if available.

7) Supportive measures

Immediately detection and management of hypoxia, hypoperfusion and hypoglycemia. Check blood glucose. If the blood glucose is less than 45mg/dl, treat for low glucose. Look for apnea, hypoxia and hypoglycemia during rewarming. IV vitamin K1 mg IM in term and 0.5mg in preterm babies, if not given earlier and hypothermia is associated with infection, start appropriate hypothermia.

8) Parental support

If the feeding is well, temperature remains within the normal range and are no other problems requiring hospitalization, discharge the baby. Advise the mother how to keep the baby warm at home.

9) Follow up

Ask family to return for follow up visit in a week. If the baby is feeding well and there are no other problems need hospitalization, discharge the baby.

10) At home

Nurse should teach the mother and family members about newborn care at home especially for maintenance of and breastfeeding. Warmth to be maintained by warm room, skin to skin contact, adequate clothing, exclusive breastfeeding, bathing with warm water in warm room, oil massage and use solar heat

Importance of plastic wrap

Some studies have suggested that wrapping premature Neonates in plastic wrap immediately after birth may help prevent low body temperature before arrival to the neonatal intensive care unit and also used as a first aid dressing for burn.

Plastic wrap to prevent hypothermia

- Plastic wrap is a conceivable choice for emerging countries. This study was conducted to test the hypothesis whether the use of low-priced plastic wrap after the baby is born can decrease hypothermia without triggering hypothermia within 1 hour of life in neonates. This study showed that by covering the body and limits of a neonates with a plastic wrap at birth can decrease the occurrence of hypothermia in first hour of life without increasing menace of hypothermia.
- The study by Li et al. (2016) examined the efficiency and the protection of using plastic wraps functional during NICU and after birth for avoiding the loss of heat in preterm newborns. Through accompanying a meta-analysis and organized review of the literature on the topic, the researchers found that plastic wrapping was related to higher reference point temperature in preterm newborns compared to unwrapped newborns.
- Both newborns with the gravidity period of below 28 weeks and between 28 and 34 weeks promoted from the use of plastic wrapping, suggesting that the involvement was associated with the dropped rates of heat loss. However, mortality rates did not drop when plastic wraps were used. The exploration points to the effectiveness of employing plastic wrap involvements for reducing the circumstance of hypothermia in babies born preterm, although the long-term impact on mortality as well as the cost-effectiveness of this system need further analysis.
- It was originating that plastic wrapping was effective for lowering the circumstance of hypothermia in preterm babies progressed lower than 28 weeks and no babies of 28-31 week's gravidity. In addition, no significant substantiation was set up to support the drop in brain injury reduction or dropped mortality rates. Other systems, similar as skin-to-skin care and trans warmer mattresses also kept babies warmer but not as effective as plastic wraps.

3. Conclusion

Neonatal hypothermia is a major health problem in our population. This is needed to increase awareness among nursing staff and mothers about the serious consequences of hypothermia particularly in low-birth-weight babies. All newborn, including pre-terms are carefully dried and given to their mother in skin- to- skin contact immediately after delivery, the risk of hypothermia is greatly reduced. Plastic wrap is an effective technique for the prevention of hypothermia in infant or preterm infants.

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