Care of the newborn in the immediate neonatal period.

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Objectives

• Understand the transition to extrauterine life
• Be able to implement routine post delivery care to the healthy term newborn.
• Thermoregulation
Transition to extra-uterine life

• In utero-fetus depends on placenta for gaseous exchange and nutrition.

• Successful transition characterized by:
  ➢ Alveolar fluid clearance
  ➢ Lung expansion
  ➢ Circulatory changes.
Alveolar fluid clearance

- Mechanisms which contribute include:
  - Labor
  - Initial breaths
  - Thoracic squeeze
Lung expansion

• With the first effective breath:
  ➢ Air movement begins as intrathoracic pressure falls
  ➢ Alveolar air spaces are expanded - establishes FRC
  ➢ Surfactant is released - this reduces alveolar surface tension, increases compliance and stabilises the FRC.
Circulatory changes

Cord is clamped ➤ placenta removed from circulation

▼

Rise in neonatal systemic pressure

▼

At the same time lung expansion reduces pulmonary vascular resistance and pulmonary artery pressure.
## Fetal vs. Infant circulation

<table>
<thead>
<tr>
<th>Fetal</th>
<th>Infant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low pressure system</td>
<td>High pressure system</td>
</tr>
<tr>
<td>Right to left shunting</td>
<td>Left to right blood flow</td>
</tr>
<tr>
<td>Lungs non functional</td>
<td>Lungs functional</td>
</tr>
<tr>
<td>Increased pulmonary resistance</td>
<td>Decreased pulmonary resistance</td>
</tr>
<tr>
<td>Decreased systemic resistance</td>
<td>Increased systemic resistance</td>
</tr>
</tbody>
</table>
Potential difficulties

• **Maternal risk factors**
  - Advanced age
  - Diabetes
  - Maternal substance abuse
  - Hypertension

• **Fetal risk factors**
  - Prematurity
  - Post maturity
  - Congenital anomalies
  - Multiple gestation
• **Antepartum risk factors**
  - Placental anomalies
  - Poly/oligo hydramnious

• **Delivery complications**
  - Transverse lie/breech presentation
  - Chorioamnionitis
  - Foul smelling/meconium stained liquor
  - Antenatal asphyxia with abnormal fhr
  - Maternal admin of narcotic within 4 hours of birth
  - Instrumental delivery
**Initial assessment**

Is the infant crying?

- Yes: No further intervention
- No: Give to mother
  - Observe

Is the infant full term?

- Yes: Further evaluation
- No: Appropriate intervention

Does the infant have good muscle tone?

- Yes: No further intervention
- No: Give to mother
  - Observe
Routine post delivery care

- Dry the infant
- Clear the airway of secretions
- Provide warmth.
Thermoneutral Environment

• Temperature and environmental conditions at which metabolic rate and O2 consumption are lowest
Body temperature in the newborn infant

• Classification of hypothermia is based on core temperature
  – NORMAL – 36.5 to 37.3°C (97.7 – 99.2°F)
  – Cold Stress 36.0 to 36.4°C (96.8 – 97.6 °F)
    • Cause for concern
  – Moderate hypothermia 32 – 35.9°C (89.6-96.6°F)
    • Danger, warm infant
  – Severe hypothermia – below 32°C (89.6 °F)
    • Outlook grave, skilled care urgently needed
How does an infant maintain temperature

- Babies try to produce heat by:
  - Increasing their metabolic rate
  - Non Shivering Thermogenesis
  - Increasing their motor tone & activity (limited response)
  - Vasoconstriction (limited response)
Increasing muscle tone and activity
Peripheral Vaso-Constriction.
Infants at risk of Hypothermia

- All infants in first 12 hours
- Low birth weight
- Preterm infants
- Asphyxiated infants
- Abnormal skin integrity
- Neurologically impaired
- Any infant already stressed metabolically.
Mechanisms of Heat Loss
Detrimental effects of hypothermia.

Cold stress → Hypothermia → Signals to hypothalamus → Activates noradrenaline release
Effects of noradrenaline

- Peripheral vasoconstriction
- Pulmonary vasoconstriction
Cold → $O_2$ consumption → Respiratory rate

$O_2$ uptake by lungs → Pulmonary vasoconstriction

$O_2$ to tissues → Peripheral vasoconstriction

Anaerobic glycolysis → in $P_O_2$ and pH

Metabolic acidosis
The warm chain

- Warm delivery room
- Immediate drying
- Skin to skin contact
- Breast feeding
- Bathing and weighing postponed
- Appropriate clothing/bedding
- Mother and baby together
- Warm transportation
- Warm resuscitation
- Training and awareness (WHO '97)
Summary

• We covered:
  ➢ Factors involved in a successful transition to extra-uterine life
  ➢ Identified potential difficulties
  ➢ Routine post delivery care
  ➢ Thermoregulation
Freebies
• http://www.gosh.nhs.uk/health-professionals/clinical-guidelines/thermoregulation-neonates
• http://www.who.int/whr/2005