
Hypothermia in Newborn

Hypothermia

- Significant problem in neonates at birth and beyond
- Mortality rate twice in hypothermic babies
- Contributes to significant morbidity & mortality

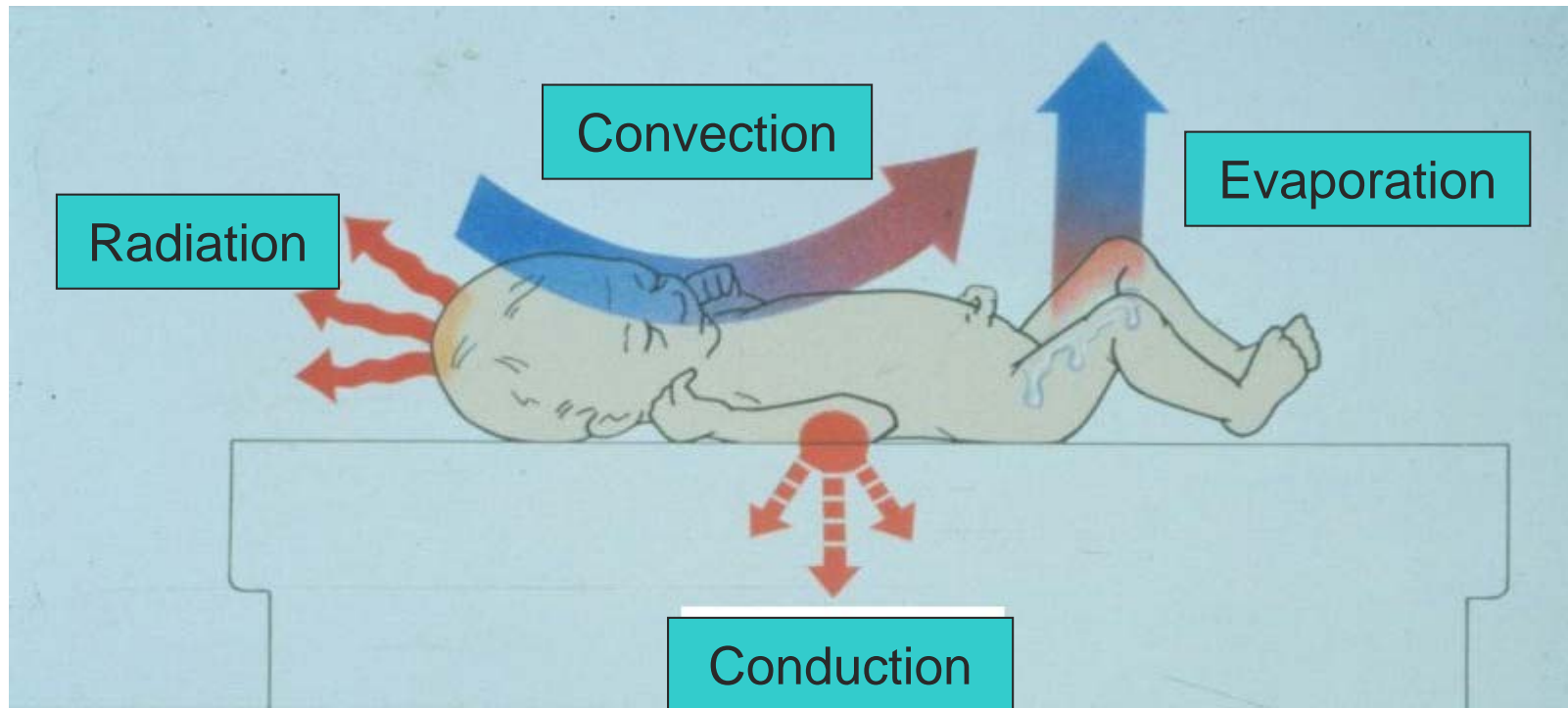
Why are newborns prone to develop hypothermia

- Larger surface area per unit body weight
- Decreased thermal insulation due to lack of subcutaneous fat (LBW infant)
- Reduced amount of brown fat (LBW infant)

Non-shivering thermogenesis

- Heat is produced by increasing the metabolism especially in brown adipose tissue
- Blood is warmed as it passes through the brown fat and it in turn warms the body

Mechanisms of heat loss

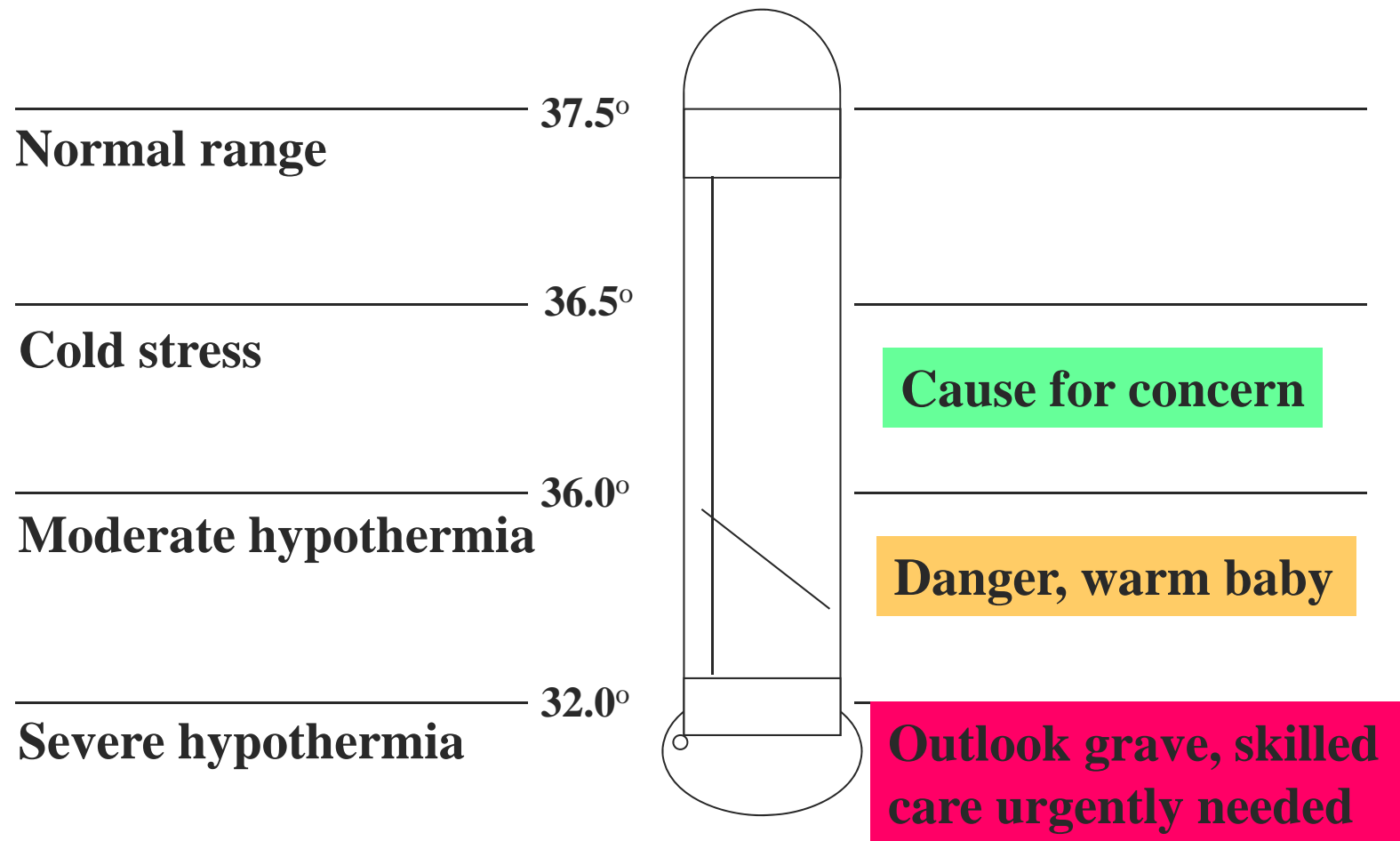


Four ways a newborn may lose heat to the environment

Neutral thermal environment

Range of environmental temperature in which an infant can maintain normal body temperature with the least amount of basal metabolic rate and oxygen consumption

Axillary temperature in the newborn ($^{\circ}\text{C}$)



Temperature recording

- Axillary temperature recording for 3 minutes is recommended for routine monitoring
- Measurement of rectal temperature is unnecessary in most situations

Diagnosis of hypothermia by human touch

Feel by touch Trunk	Feel by touch Extremities	Interpretation
Warm	Warm	Normal
Warm	Cold	Cold stress
Cold	Cold	Hypothermia

Prevention of hypothermia: Warm chain

1. Warm delivery room (>25° C)
2. Warm resuscitation
3. Immediate drying
4. Skin-to-skin contact
5. Breastfeeding
6. Bathing postponed
7. Appropriate clothing
8. Mother & baby together
9. Professional alert
10. Warm transportation

Prevention of hypothermia at birth

- Conduct delivery in a warm room
- Dry baby including head immediately with warm clean towel
- Wrap baby in pre-warmed linen; cover the head and the limbs
- Place the baby skin to skin on the mother
- **Postpone bathing**

Kangaroo care

- Assists in maintaining temperature
- Facilitates breastfeeding
- Increases duration of breastfeeding
- Improves mother-baby bonding

The Kangaroo method



Place baby in this position

Then cover with clothes

Bathing the baby

Timing of bath

- Small&/or LBW:
Till the cord falls or preferably till 2.5 kg weight
- Sick /admitted in nursery:
No bath
- Term baby:
Postpone till next day

Procedure

- Warm room and warm water
- Bathe quickly and gently
- Dry quickly and thoroughly
- Wrap in a warm, dry towel
- Dress and wrap infant
- Use a cap
- Keep close to mother

Bathing the baby



Warm room – warm water



Dry quickly & thoroughly



Dress warmly and wrap



Give to mother to breast feed

Cot-nursing in hospital (mother sick)

- Cover adequately
- Keep in thermoneutral environment
- Monitor temperature 3 hourly during initial postnatal days

Prevention of hypothermia (during transport)

- Let temperature stabilize before transport
- Document temperature and take remedial measures
- Carry close to chest, if possible in kangaroo position
- Cover adequately, avoid undressing
- Use thermocol box with pre-warmed linen or plastic sheet or water filled mattress with thermostat

Signs and symptoms of hypothermia

- Peripheral vasoconstriction
 - acrocyanosis, cold extremities
 - decreased peripheral perfusion
- CNS depression
 - lethargy, bradycardia, apnea, poor feeding

Signs and symptoms (*cont..*)

- Increased pulmonary artery pressure
 - respiratory distress, tachypnea
- Chronic signs
 - weight loss, failure to thrive

Management: Cold stress

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- Cover adequately - remove cold clothes and replace with warm clothes
 - Warm room/bed
 - Take measures to reduce heat loss
 - Ensure skin-to-skin contact with mother; if not possible, keep next to mother after fully covering the baby
 - Breast feeding

Monitor axillary temperature every $\frac{1}{2}$ hour till it reaches 36.5° C, then hourly for next 4 hours, 2 hourly for 12 hours thereafter and 3 hourly as a routine

Management: Moderate hypothermia(32.0°C to 35.9°C)

- Skin to skin contact
- Warm room/bed
- Take measures to reduce heat loss
- Provide extra heat
 - 200 W bulb
 - Heater, warmer, incubator
 - Apply warm towels

Management: Severe hypothermia (<32°C)

- Provide extra heat preferably under radiant warmer or air heated incubator
 - rapidly warm till 34°C, then slow re-warming
- Take measures to reduce heat loss
- IV fluids: 60-80 ml/kg of 10% Dextrose
- Oxygen, Inj.vitamin K 1mg in term & 0.5 mg in preterm
- If still hypothermic, consider antibiotics assuming sepsis

Monitor HR, BP, Glucose (if available)

Hyperthermia > 37.5°C

- Problem in summer months
- May indicate infection in term babies
- Irritable, increased HR & RR
- Flushed face, hot & dry skin
- Apathetic, lethargic and pale
- Stupor, coma, convulsions if temperature > 41°C

Management of hyperthermia

- Place the baby in a normal temperature environment (25 to 28⁰C), away from any source of heat
- Undress the baby partially or fully, if necessary
- Give frequent breast feeds
- If temperature > 39⁰C, sponge the baby with tap water; don't use cold / ice water for sponge
- Measure the temperature hourly till it becomes normal

Conclusion

- Prevent hypothermia, maintain “Warm chain”
- Ensure closer monitoring and stricter preventive measures for LBW and other at risk neonates
- Early detection by human touch and prompt remedial measures are key for reducing this preventable morbidity