Neonatal Golden Hour
Preparation and Stabilization for Transport

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Objectives

• “Golden Hour” concept and implications
• Best practices to reach optimal outcome
• Discuss the role of the team
• Discuss tools to improve performance
“Golden Hour”

- Concept derived from adult trauma
  - Idea that first hour of care is critical

- “What happens in the first hour of life can lead to short and long term consequences, affect neurodevelopmental status and result in death”. Annibale et al
“Golden Hour” Multitasking

- Thermoregulation
- Resuscitation
- Respiratory Management
- Circulation
- Glucose
- Infection Prevention
- Arrange for appropriate transfer
Thermoregulation

- Hypothermia → Morbidity and mortality.
- "Golden hour" goal: 36.5 °C AAP / NRP

- Late preterm / Term
  - Adequate room temperature
  - Pre-heat radiant warmer
  - Warm blankets
  - Dry and remove wet towels.
  - Use hat
  - Skin to skin
  - Skin probe on infant- Set at 36.5 °C
Thermoregulation and Premature

**Recommendations:**

- Delivery room temperature 77-79°F (25-26°C)
- Radiant warmer on **prior** to delivery
- Pre-warmed blankets / hat
- Polyethylene bag in <29 week gestation
- Chemical mattress
- Transport in a pre-warmed incubator
- Heated and humidified gas preferable
Hypoxic Ischemic Encephalopathy

- Criteria:
  - Suspected perinatal insult
  - >36 weeks gestation
  - APGAR score at 10 min <5
  - Need for continued resuscitation
  - pH <7.0 or base deficit >16 mmol/L
Hypoxic Ischemic Encephalopathy

**Recommendation:**
- Contact tertiary center **ASAP**......earlier rather than later!
- Evidence that cooling (head / body) improves outcome for moderate HIE Shankaran
- Must be instituted by **6 hours of life**
- **While waiting for transport:**
  - Turn “off” radiant warmer
  - Monitor temperature closely:
    - If temperature <34°C turn warmer on low – monitor
  - Support ventilation (goal PH 7.35 -7.45), blood pressure, glucose. IV fluids: 60ml/kg/day, monitor for seizures
Respiratory Management

- **ABC** Still apply in newborns.
  - Establishing effective ventilation is the key to successful neonatal resuscitation

- **Goal:** “Use the least amount of intervention necessary to support normal gas exchange while minimizing lung injury”  
  
  Doyle et al
Respiratory Management

- Blender / Pulse oximetry
  - Titrate oxygen
- PPV
- Surfactant: “Earlier rather than later”
- Establish functional residual capacity (FRC)
  - CPAP
  - “INSURE” - CPAP
Circulation

- Identify patients at higher risk for shock
- Early intravenous access
- Umbilical venous catheter
- Administration of volume
  - Normal saline: 10 ml/kg
Infection Prevention

- Infection - major cause of morbidity and mortality.
- Subtle presentation
  - Respiratory distress, poor perfusion, temperature instability, feeding intolerance, tachycardia, abnormal neurologic status.
- Blood culture but do not delay treatment.
- Adults: Every hour of delay → 8% ↑ mortality
  
  "Golden Hour" Goal: Administer antibiotics
Glucose

• Infants at higher risk
  • Premature
  • Small or large for gestational age
  • Infants of a diabetic mother
  • Sick

• “Golden Hour” Goal: Obtain glucose / Treat
  • Goal: 50 – 110 mg/dl
  • If glucose <40: D10W bolus + D10W maintenance
  • Monitor q1 hour
Lab Work

- Blood gas
  - CBG
  - ABG
- Glucose
- Blood culture
- CBC
- Chest X-ray
Family Centered Care

• Birth of a high-risk neonate extremely stressful.
• Communication is key
• Facilitate attachment
• May be able to transfer parent
  • Not mother if still hospitalized
Some numbers to remember….

- **ETT** size: 500-1000 grams: 2.5 ETT / 1000 – 2000: 3.0 ETT / 2000-3000 grams: 3.5 ETT / >3500 grams: 4.0 ETT
- **ETT** depth: 6+ Birth weight (BW)
- **PIV**: 24 gauge
- **UVC**: 3.5 French, 5 French (Double lumen). Placement: 3xBW+9/2
- **UAC**: 3.5 French, 5 French (Single lumen). Placement: 3xBW+9
- **IV Fluid**: D10Water
- **TF goal**: 60 – 100 ml/kg/day (Gestational Age)
- **Boluses**
  - D10 W 2-3 ml/kg / Normal Saline 10 ml/kg over 15-30 minutes
- **Ampicillin**: 100 mg/kg
- **Gentamicin**: 4 mg/kg
• More important than previously thought
• Culture change
• Standardize
Big team for a small baby

- Obstetrician
- Pediatrician / Family Practice MD
- Anesthesia
- RN / RT, etc...
- Referring hospital
- Transport Team
- Tertiary Care Center
High-risk neonate / Was not high risk but now sick!

Notification – Prenatal steroids / Antibiotics

Team Response

Preparation – Checklist

Resuscitation

Stabilization / Procedures

Transfer

Dunn
Preparation

- Disseminate recommendations
- Involve all players
- Evaluate your own setting
- OB / Anesthesia / Pediatrics / Family Practice...
Equipment

• **Temperature**
  • Warmer, blankets, hat, polyethylene bag, chemical mattress, mom

• **Airway / Breathing**
  • Bulb suction, meconium aspirator, Mask, bag, oxygen (blender), pulse oximeter, laryngoscope (00, 0, 1 blade), ETT (2.5, 3.0, 3.5 uncuffed), suction catheter

• **Circulation**
  • PIV catheter, UVC, normal saline, D10 W
“Practice makes perfect”

- Multiple tasks
  - Cognitive / Procedural
  - Communicative / Managerial.

- Simulation / Debriefing
  - Ideal for adult learners
  - Practice infrequent scenarios frequently
  - Develop roles, identify problems.
  - “Low dose, high frequency”
Arkansas Resources

- Patient care
  - Consults
    - OB (ANGELS) / Peds (ACH- ANGEL One)
  - Maternal transports
    - ELBW delivered at tertiary care centers have better outcomes. AAP / ACOG Perinatal Care Guidelines
  - Assistance with delivery
    - Presence of skilled transport team at a high-risk preterm delivery improves quality of resuscitation. McNamara
- Arrange transport to ACH
Arkansas Resources

• Training
  • Neonatal Resuscitation Program (NRP)
  • STABLE®
  • Neonatal “mock code”
  • Come to you / Simulation centers UAMS / ACH
“Children are our most valuable resource”

H. Hoover
U.S President
Thank you

Questions???
References

- Shankaran S. Neonatal Encephalopathy: Treatment With HypothermiaSeetha Shankaran NeoReviews 2010;11:e85-e92 DOI: 10.1542/neo.11-2-e85
- Dunn Michael S. The Golden Hour. Giving High-risk Neonates the best possible start. AAP Perinatal Section website.
- UAMS Angels Guidelines (Neonatal Resuscitation, Preparation and Stabilization for Transport), University of Arkansas for Medical Sciences 2013