Neonatal Resuscitation & Pre-Transport Stabilization

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Objectives

• Review rapid assessment of neonatal patients
• Review differences between NRP and PALS
• Review neonatal clinical presentations, pre-transport & transport clinical considerations
• Review neonatal case studies and apply principles of NRP & STABLE through selection of clinical interventions appropriate for the clinical scenario.
• Review neonatal peri-transport stabilization priorities
• Review neonatal airway management, vascular access options, warming measures, & glycemic control
This outreach education presentation is intended as an overview of basic concepts surrounding assessment of the pregnant patient, OB complications and stabilization priorities for maternal and newborn patients.

Follow your designated hospital and county protocols, policies and guidelines for actual care of obstetric and newborn patients.
Case Study:
EMS Dispatch Female With Abdominal Pain
You Arrive On-Scene: Unexpected Newborn Delivery ~ 26 weeks
Rapid Newborn Assessment: Apnic, Dusky, HR palpable ~ 80bpm
What Are Your Clinical Priorities?
Delivery Outside Of OB Unit: Now What??

- **Supplies:** OB Kit & Neo Ventilation Device
- **Place infant on mother's abdomen after birth**

- **Clamp cord 8-10 inches from baby**
  - Use 2 clamps several inches apart: cut between clamps
  - Delayed Cord Clamping X 30-60 seconds IF VIGOROUS
  - Immediate Cord Clamping IF NONVIGOROUS

- **Provide basic newborn care**
  - Clear Airway & Optimal Airway Positioning
  - Dry Thoroughly & Provide Warmth
  - Continuous assessment of ABC's
  - Thermoregulation & Blood Glucose

Source: Neonatal Resuscitation Program. AAP. 7th Edition
Tiny Ones: Preterm Delivery Priorities

Delayed Cord Clamping:

IF vigorous DCC → reduction of IVH
IF NONVIGOROUS → immediate umbilical cord clamping & NRP

Thermoregulation & Neuroprotection: Keep em’ warm & handle gently

Warming mattress, isolation bag, hat, nesting, & head alignment with gentle handling

NRP Guidelines: ABC, ensure chest rise and correct PPV/BVM rate

SpO2 & ECG, CPAP, PPV, airway & perfusion support, careful fluid administration, glycemic control, early activation of neonatal & transport teams!

Source:
Neonatal Resuscitation & Stabilization Priorities

• NRP: A, B, C versus PALS
  • Airway, Airway, Airway
  • Ventilation Rate Adequate? Do You Have Slight Chest Rise?

• Stabilization Measures: The S.T.A.B.L.E. Program
  • Glycemic Control
  • Thermoregulation
  • Perfusion Support
  • Preparation For Transport
  • Transfer to higher level of care

Neonatal Airway Management: Babies are different…..

• Anatomical Challenges
• Ventilation Device Options
• Establishing Effective Ventilation
  • Ensure Adequate Rate: 40-60
  • Slight Chest Rise
• Oxygenation
• Ongoing Airway Support modalities
• Alternative Airway Needed?
• Vt’s of newborns compared to adult?
• Common ventilation support: BVM Rate & Pressures?

Source
1. AAP. Neonatal Resuscitation Program. 7th Edition
2. The S.T.A.B.L.E. Program. 6th Edition
Neonatal Vascular Access

Emergent UVC:
- 18-20 gauge IV catheter: Prep—Tie—Cut--Cannulate
- Single lumen UVC catheter 3-5 cm, obtain blood return
- <1500 Grams/30 weeks 3.5 F and >1500 Grams/30 weeks 5.0 F

PIV Placement
- 24g

IO Placement
- Proximal Tibia & Distal Femur
- EZ IO ≥3kg
- Manual IO <3kg

Fluid Resuscitation
- NRP versus PALS

Source
1. AAP. Neonatal Resuscitation Program. 7th Edition
2. The S.T.A.B.L.E. Program. 6th Edition
Neonatal Fluid Resuscitation

Indication:
- Not responding to resuscitation
- Appears in “shock” hypo-perfused
- History of blood loss

**DOSE:** 10 ml/kg

**SOLUTION:** Normal Saline or O Rh- negative PRBC’s (if indicated)

**ROUTE:** PIV, UVC or IO (proximal tibia or distal femur)

**RATE:** Over 5-10 min. Preterm precautions

**Total neonatal circulating blood volume:**
- 80-90ml/kg

Source:
Keep Em’ Dry, Warm & Sweet
Thermoregulation Measures & Blood Glucose Surveillance

heel stick:

- Hatched areas (arrows) indicate safe areas for puncture site.
Case Study: ED Admit
37.5 weeks, 5do, 3.1kg difficulty breathing, hypothermia

Clinical Priorities?

- Tachypnea: Respiratory Rate 70-80
- Increased WOB
  - Grunting
  - Retractions: Moderate/Severe
- Hypoxemia: sp02 low 90’s
- Hypoglycemia: BG 41
- Hypothermia: 35.9 C
- Hypotonic: decreased responsiveness

- I/O’s: Decreased PO Intake X 1 day & 3 diapers in the last 24 hours (consider eating is a newborn vital sign)

https://www.youtube.com/watch?v=NBA9iigiDgk
CXR Findings In The ED: Suspected Pneumonia
Birth History Risk Factors? 
Before & During Birth

• Prolonged Rupture of Membranes > 18 hours?

• PPROM?

• Maternal Chorioamnionitis?
  • Maternal fever/ infection
  • Fetal tachycardia
  • Foul smelling amniotic fluid
  • Did MOB receive antibiotics during labor >4 hrs before birth?

• Meconium aspiration

Sources:
Neonatal Sepsis Clinical Priorities

- Rapid Consult, Stabilization & Transport to Regional Center
- NRP then STABLE
- Airway Support: noninvasive and/or invasive
- Perfusion Support:
  - Volume resuscitation/bolus
  - Pressor support (ensure adequate preload)
- Glycemic Control: Glucose bolus (as needed) + MIVF
- Thermoregulation: Goal temp 36.5C-37.5C
- Sepsis screen: CBC w/differential and Blood Cultures
- Early initiation of antibiotics: Amoxicillin & Gentamycin
  - Consider/discuss antivirals if neuro assessment abnormal

Source
1. AAP. Neonatal Resuscitation Program. 7th Edition
2. The S.T.A.B.L.E. Program. 6th Edition
# Neonatal Sepsis

<table>
<thead>
<tr>
<th></th>
<th>Signs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General signs</strong></td>
<td>Bad general state; Temperature instability</td>
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<tr>
<td><strong>Neurologic signs</strong></td>
<td>Apathy, irritability; strident cry; Hypotonia, hyporeactivity, seizures, coma;</td>
</tr>
<tr>
<td><strong>Respiratory signs</strong></td>
<td>Apnea, tachypnea; Cyanosis, grunting; costal retractions</td>
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<tr>
<td><strong>Digestive and abdominal</strong></td>
<td>Feeding difficulties, poor sucking reflex; Abdominal distension; hepatosplenomegaly; Vomiting, diarrhea;</td>
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<tr>
<td><strong>Cardiovascular signs</strong></td>
<td>Pallor, cyanosis; prolonged capillary refill time; Tachycardia/bradycardia; arrhythmia; Cold extremities; hypotension, edema;</td>
</tr>
<tr>
<td><strong>Skin</strong></td>
<td>Purpura, petechiae, omphalitis, cellulite, scleredema</td>
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<tr>
<td><strong>Hematological</strong></td>
<td>Jaundice, hemorrhage, purpura;</td>
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<tr>
<td><strong>Musculoskeletal system</strong></td>
<td>Palsy, abnormal position of limbs; pain.</td>
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Case Study:
ED, born @ term, 3.9 kg, 22 d/o

• Tachycardic: HR 170’s
• Labored Breathing
• Compromised Perfusion
• Acidotic
• Tender, distended abdomen
• Bilious vomiting
• Bloody stools
• Stopped eating
• Fussy all day
Suspected Bowel Obstruction
Clinical Priorities

• Rapid Consult, Stabilization & Transport to Pediatric Surgical Center
• Airway & Oxygenation Support
• Perfusion Support
• Gastric Decompression: Orogastric Tube 8F or 10F
• Glycemic Control: Glucose bolus (as needed) + MIVF = D10W
• Thermoregulation: initiate warming measures
• Comfort Measures
• Rapid Transport: Potential Surgical Emergency & Time Sensitive

Source
1. AAP. Neonatal Resuscitation Program. 7th Edition
2. The S.T.A.B.L.E. Program. 6th Edition
Free Air On Xray Is A Surgical Emergency
Considerations For Neonatal Altered LOC
THE MISFITS

• T= Trauma
• H= Heart disease or Hypovolemia
• E= Endocrine – Hypoglycemia
• M= Metabolic--Electrolytes
• I= IEM
• S= Sepsis
• F= Formula error
• I= Intestinal catastrophes
• T= Toxins/ Poisons
• S= Seizures
Neonatal Skills Review

• Neonatal Airway Management
  • Positioning: shoulder roll & sniffing position
  • BVM/PPV: Mask size, rate, pressures, & devices
  • CPAP
  • LMA
  • Intubation

• Vascular Access

• Thermoregulation: warming measures

• Glycemic Control: Calculating D10W Bolus & MIVF
Thank You & Questions