

Naughty Neonates

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Disclaimer

- Conflicts of interest: None
- Employer: Idaho State University and Bingham Memorial Hospital
- Sponsorship/Commercial support: None

Background

- Clinical Assistant Professor since Jan 2016
 - Teach Adult Nursing Health I and II, along with clinical components
- House Supervisor at Bingham Memorial Hospital in Blackfoot, Idaho
- Utah State Emergency Nurses Association President, 2016-2018
- Journal of Emergency Nursing
 - Reviewer
- Emergency Nurses Association
 - Test Item Writer and Reviewer/Publication Writer and Reviewer
- 8 years of Critical Care, Emergency, and Trauma Nursing
 - Level 1 trauma centers to rural community hospitals
 - ICU, ED, LifeFlight and Trauma Resuscitation
 - Emergency Department Manager/Educator
- Board Certified in Emergency, Pediatric Emergency, and Critical Care

Objectives

- Understand normal pathophysiologic changes associated with neonates (newborns)
- Review Neonatal Resuscitation (NRP) initiatives
- Discuss and understand common complications seen with newborn patients
- Recognize interventions that will improve the care of newborn patients that are related to the disease processes

Terminology

- Let's take a few moments to discuss terms:
 - Neonate – birth to 28 days
 - Term – 37-40 weeks of pregnancy
 - Pre-term – <37 weeks pregnant
 - A pre-term infant is considered a neonate (newborn) until the expected due date plus 28 days
 - Infant – 1-12 months
 - Toddler 13 months to 3 years
 - Preschoolers – 3 – 5 years
 - School-Aged Child – 5-11 years
 - Adolescent – 11-18 years

Neonates – description anat and phys

- Crying is the primary language
- Behavior is reflexive in nature
- Loses 5%–10% of birth weight by day 3 or 4
 - But will regain within 10 days
- Reflexes should be symmetrical
 - Flexion is typical, extremities are pulled close to the chest and abdomen
- Heat loss is a concern
 - Body surface area to weight is 3 times the ratio of an adult
- Vulnerable to hypoglycemia
 - Limited glycogen and fat stores
- Obligatory nose breathers
 - Up until age 3 months

Anatomical/Physiological Differences

- Respiratory
 - Periodic breathing
 - Apnea
 - Tachypnea
- Cardiovascular
 - Small stroke volume
 - Capillary refill < 3 sec
 - Compensate with increased HR
- Integumentary
 - Thinner skin



Anatomical/Physiological Differences

- Gastrointestinal system
 - First stool – thick, greenish-black and tarry, should pass 24 hours post delivery
- Genitourinary system
 - Immature kidney function, cannot concentrate urine
- Neurological system
 - Reflexes are present
 - Anterior fontanel
 - Shows head trauma, fluid balance
- Fluids and electrolytes
 - Risk for hypoglycemia



Thermoregulation

- Susceptible to hypothermia
 - Large body surface to weight ratio
 - Unable to shiver
 - Limited compensatory mechanisms
- Limited ability to dissipate heat
- React to cold stress
 - Increased metabolic rate
 - Increased oxygen consumption
 - Increased glucose consumption
 - Poor response to resuscitation

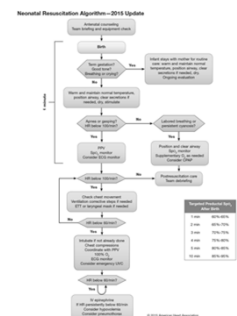
Neonate – Physical Needs

- Remember the acronym BABE:
 - B – Blood Glucose
 - Breastfeeding and glucose monitoring help ensure adequate supply of sugar available for neonate and prevent hypoglycemia
 - A – Airway
 - Assessing for airway complications and intervening to achieve patency (suctioning mouth then nares)
 - B – Breathing
 - Provide breathing as needed to increase oxygenation and cardiac performance post-delivery
 - E – Environment
 - Maintain normothermia to prevent hypo/hyperthermic conditions

Tools for providing care

- N-PASS
- Apgar
- PAT – Pediatric Assessment Triangle
 - General Appearance, Work of Breathing, and Circulation
 - Gives a quick understanding to severity of child's injury/illness
- ABCDE's
- SAMPLE history
 - Signs/Symptoms
 - Allergies
 - Medications
 - Past Medical History (including delivery information)
 - Last meal eaten
 - Events that led up to the present illness/injury
- NRP/S.T.A.B.L.E.

Neonatal Resuscitation



Assessment

- Assessment of the neonate should progress from least invasive to most invasive
- Provide warmth when assessing neonates to prevent hypothermia
- Observe general appearance, work of breathing, skin color
- Neonates cry when disturbed, hungry, or cold
- Respond to warmth, soothing voices, and gentle hands
- Assess ABCDE's
 - A- Airway for patency, no secretions or swollen tongue
 - B- Breathing for symmetrical chest rise and fall, rate, rhythm, and depth
 - C- Circulation for warm, dry, pink skin, with CRT <3 seconds
 - D- Disability for normal reflexes and flat anterior fontanel
 - E- Environment for any sign of injury and maintaining normothermia with warming measures
 - S- Safety of infant with proper holding and positioning of infants

Selected Diagnostics and Interventions

- Radiological studies
 - Chest radiograph
 - Specific studies
- Laboratory studies
 - Blood gas
 - Glucose
 - Complete blood count
 - Total and direct bilirubin
 - Electrolyte studies



General Interventions

- Obtain weight without a diaper
- Protect from infection
- Treat hypoglycemia
- Maintain normothermia
- Initiate IV fluids for decreased oral intake
- Assess for and treat pain
- Facilitate family presence

Potential Neonatal Emergencies

N	• Inborn errors of metabolism
E	• Electrolyte abnormalities
O	• Overdose
S	• Seizures
E	• Endocrine crisis
C	• Cardiac abnormalities
R	• Recipe
E	• Enteric emergencies
T	• Trauma
S	• Sepsis

Cardiac Complications

- Congenital Heart Defects
 - Coarctation of the Aorta
 - Patent Ductus Arteriosus
 - Tetralogy of Fallot
 - Atrial or Ventricular Septal Defect
 - Cardiogenic Shock secondary to conditions above
 - Signs/Symptoms
 - Cyanosis with feedings
 - Crying produces pink coloring
- Management
 - Echocardiography
 - Intravascular access
 - Prostaglandin infusion (0.05 mcg/kg/minute) PGE1
 - Correct metabolic acidosis with ventilation support
 - Small amounts of fluid to correct cardiogenic shock
 - Dopamine - 1st drug for improving cardiac functioning
 - Temperature maintenance

Cardiac Complications

- Supraventricular Tachycardia
 - Signs and Symptoms
 - Poor feeding, lethargy,
 - Cardiac telemetry - Rates up to 230 beats/min, can go up to 300 beats/min
 - Treatment
 - Vagal maneuver - Bag of ice water to face - Never use JUST ice, can cause thermal burns
 - Adenosine - 0.1 mg/kg - 1st dose, then 0.2 mg/kg for 2nd and 3rd dose
 - If unresponsive to above OR unstable, cardioversion at 0.5-1 joules/kg
 - Remember to put in SYNC mode for cardioversion to prevent ventricular tachycardia!

Respiratory Complications

- Respiratory
 - Atresia
 - Aspiration (Meconium, Amniotic fluid)
 - Pneumonia
 - Bronchiolitis (RSV)
- Management
 - Maintain patent airway, suction may be needed to clear mouth/nares for neonates with RSV
 - Provide oxygen and ventilation as needed
 - IV with normal saline as needed, caution to give large amounts of fluid, as this can cause pulmonary congestion and exacerbate respiratory complications
 - Monitor Glucose and maintain thermoregulation

Neurologic Complications

- Neurologic
 - Seizures
 - Multiple causes and may not be noticeable
 - Management
 - ABC's
 - Check Glucose – blood sugars can cause seizures in neonates
 - Glucose must be given in the form of D10 (<D10, ie D25/D50 is too hard on neonates blood vessels and too hypertonic, D5 is hypotonic and either can further complicate neurologic functioning)

Endocrine Complications

- Endocrine
 - Electrolyte Imbalance
 - Potassium
 - Sodium
 - Over/underdilution of formula - Ensure proper mixing of formula to prevent
 - Glucose
 - Monitor Glucose on EVERY neonate to assess for hypoglycemia!
 - Hyperbilirubinemia
 - Inability of liver to conjugate bilirubin, increasing levels which cause jaundice
 - Signs/Symptoms
 - Yellow discoloration, poor feeding, lethargic
 - IV fluids, phototherapy

Gastrointestinal Complications

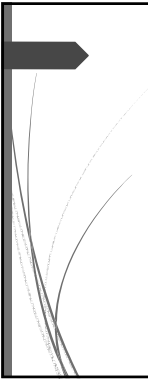
- GI
 - Esophageal or Tracheoesophageal Atresia
 - Drooling, coughing, and choking are signs, needs surgery to fix
 - Pyloric Stenosis
 - Narrowing of pylorus which causes projectile vomiting, right after feeding; can cause hypovolemia and metabolic alkalosis, associated with weight loss, 2-6 weeks is when this usually occurs
 - Fixed with a surgical procedure to open up the pylorus opening and allow food to pass into small intestine
 - Malrotation with Volvulus
 - Rotation of bowel is interrupted and can cause ischemia and necrosis
 - Signs include abdominal distention, bloody bowel movements, bilious vomiting
 - Surgery needed to fix and correct rotation
 - Intussusception
 - Bowel telescopes over itself, can lead to ischemia and necrosis
 - Hallmark sign is current-jelly stools, abdominal pain
 - Surgery needed to fix and correct telescoping

Shock and Trauma

- Trauma – Accidental and Non-Accidental (Inflicted)
 - Subtle symptoms that can mimic many disorders
 - Thorough history on all neonates with suspected trauma needed to ensure trauma was not intentional
 - If suspected abuse, MUST be reported to authorities
 - Maintain ABCDE's, Glucose, Thermoregulation, IV and C1/MRI may be needed
- Sepsis
 - Rare but life-threatening
 - Common causes – Group B Strep, E. coli, Staph, Flu, listeria
 - Sources – Meningitis, Pneumonia, UTI
 - Signs/Symptoms
 - 'Not acting right'
 - Increased or decreased temperature
 - Signs of shock
 - Tachycardia, tachypnea
 - Inhibable/lethargic
 - Treatments
 - Cultures (Urine/Blood) prior to antibiotic initiation – within 1 hour of arrival to ED
 - Antibiotics – Ampicillin or Claforan
 - IV fluids to maintain blood pressure (10 + 2x age in years, systolic)
 - Glucose/Thermoregulation

Summary

- Always check ABCDE's
- Check Glucose on ALL neonates
- Maintain warmth on all neonates with blankets and radiant warmer
- Most neonatal problems come from cold, low sugar, and lack of oxygen
- Be judicious with fluid and oxygen administration as small amounts can change physiologic responses



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