Chapter 36
Neonatology

Learning Objectives

- Define the terms newly born, neonate, and newborn
- Discuss antepartum and intrapartum factors associated with increased risk for neonatal resuscitation
- Identify factors that lead to premature birth and low-birth-weight newborns

Learning Objectives (Cont'd)

- Discuss assessment findings associated with primary and secondary apnea in the neonate
- Discuss pulmonary perfusion and asphyxia
Learning Objectives (Cont'd)

- Describe the etiology, epidemiology, history, and physical findings for the following congenital anomalies:
  - Tracheoesophageal fistula
  - Diaphragmatic hernia
  - Choanal atresia
  - Pierre Robin sequence
  - Meningomyelocele
  - Cleft lip, palate
  - Omphalocele

Learning Objectives (Cont'd)

- With the patient history and physical examination findings, develop a treatment plan for newborns with the following conditions:
  - Tracheoesophageal fistula
  - Diaphragmatic hernia
  - Choanal atresia
  - Pierre Robin sequence
  - Meningomyelocele
  - Cleft lip, palate
  - Omphalocele

Learning Objectives (Cont'd)

- Discuss indications, necessary equipment, technique, and assessment of the newborn’s response for the following interventions:
  - Blow-by oxygen delivery
  - Ventilatory assistance
  - Orogastric tube insertion
  - Chest compressions
  - Tracheal intubation
  - Vascular access
  - Needle chest decompression
Learning Objectives (Cont’d)

• Identify the primary signs used for evaluating the newborn during resuscitation
• Discuss the initial steps in and formulate a treatment plan for providing initial care to the newborn, including transport guidelines
• Identify the appropriate use of the Apgar score in caring for the newborn

Learning Objectives (Cont’d)

• Calculate the Apgar score for various newborn situations
• Describe the etiology, epidemiology, history, and physical findings for newborn cardiac arrest
• Develop a treatment plan for a newborn in cardiac arrest

Learning Objectives (Cont’d)

• Discuss the signs of hypovolemia in the newborn
• Discuss a treatment plan to stabilize the neonate after cardiac arrest
• Describe the etiology, epidemiology, history, and physical findings for the following conditions:
  ➢ Meconium aspiration
  ➢ Apnea
Learning Objectives (Cont’d)

- Describe the etiology, epidemiology, history, and physical findings for the following conditions:
  - Bradycardia
  - Prematurity
  - Respiratory distress or cyanosis
  - Seizures
  - Fever
  - Hypothermia
  - Hypoglycemia
  - Vomiting

Learning Objectives (Cont’d)

- Describe the etiology, epidemiology, history, and physical findings for the following conditions:
  - Diarrhea
  - Birth injury

Learning Objectives (Cont’d)

- With the patient history and physical examination findings, develop a treatment plan (including transport destination) for newborns with the following conditions:
  - Meconium aspiration
  - Apnea
  - Bradycardia
  - Prematurity
  - Respiratory distress or cyanosis
  - Seizures
Learning Objectives (Cont'd)

- With the patient history and physical examination findings, develop a treatment plan (including transport destination) for newborns with the following conditions:
  - Fever
  - Hypothermia
  - Hypoglycemia
  - Vomiting
  - Diarrhea
  - Birth injury

Learning Objectives (Cont'd)

- Discuss the effects of maternal narcotic use on the newborn and formulate a treatment plan for a newborn with narcotic depression

Introduction

- Newborn
  - First minutes, hours after birth
- Neonate
  - Baby from birth to 28 days
Transitional physiology (adjustments to extrauterine life)
- O₂, nutrients, waste products diffuse across placenta from mother's blood to baby's blood
- Fetal blood chemistry alterations allow intrauterine survival
- Fetal circulation interacts with placenta via the umbilical cord

Newly Born Principles of Resuscitation

Newly Born Principles of Resuscitation (Cont'd)

Newly Born Principles of Resuscitation (Cont'd)
- Transitional physiology (adjustments to extrauterine life)
  - Fetal lungs nonfunctional, blood flow for oxygenation not required
Newly Born Principles of Resuscitation (Cont’d)

Transitional physiology (adjustments to extrauterine life)
- Alveoli open, filled with fetal lung fluid instead of air, pulmonary blood vessels constricted
  - Before labor, fetal lung fluid production decreased by one-third
  - During vaginal delivery, newborn’s chest is squeezed, reducing fluid by another one-third

Transitional physiology (adjustments to extrauterine life)
- Adjustment from intrauterine to extrauterine function
  - Newborn must obtain nutrients, perform digestion, waste elimination, temperature regulation
  - Respiration
  - Alveoli filled with air first time, surfactant helps
Newly Born Principles of Resuscitation (Cont’d)

- Transitional physiology (adjustments to extrauterine life)
  - Adjustment from intrauterine to extrauterine function
    - Initial cries, deep breaths move lung fluid out of airways
    - Air lungs fill with air, pulmonary blood vessels relax, increases blood flow to lungs

Potential transitional problems
- Newborn breathes insufficiently to force fluid from alveoli
- Meconium blocks air from entering alveoli
- Insufficient blood return from placenta before and during birth
- Poor cardiac contractility

- Bradycardia from insufficient delivery of O₂ to heart, brainstem
- Insufficient O₂ to brain and muscles
- Insufficient O₂ to brain
- Lack of O₂/failure to distend lungs with air, sustained constriction of pulmonary arterioles
Newly Born Principles of Resuscitation (Cont’d)

- Transitional physiology (adjustments to extrauterine life)
  - Blood in umbilical vein begins to clot, completed occluded 2-5 days
  - Umbilical vein transitions into ligamentum teres hepatis
  - Ligamentum arteriosum develops from closure of ductus arteriosus
  - Ductus venosus closure, ligamentum venosum
  - Septum primum, blood flow cessation through foramen ovale

Factors associated with increased risk for neonatal resuscitation

- Low birth weight, preterm birth
  - Complications increase as birth weight decreases
  - Mother’s nutrition, diet, lifestyle
Newly Born Principles of Resuscitation (Cont'd)

- Factors associated with increased risk for neonatal resuscitation
  - Low birth weight, preterm birth
    - Gestational age affects need for resuscitation
    - Successful resuscitation
  - Antepartum risk factors
    - Maternal age ≥35 years or <16 years
    - Maternal pre-eclampsia, diabetes
    - Maternal bleeding in second/third trimester
    - Maternal drug therapy
    - Maternal substance abuse
    - Chronic/pregnancy-induced hypertension
    - Chronic maternal illness
    - Maternal anemia, infection
  - Premature membrane rupture
  - Previous fetal/neonatal death
  - Postterm gestation
  - Multiple gestation
  - Size/date discrepancy
  - Inadequate/no prenatal care
  - Diminished fetal activity
  - Fetal malformation
Newly Born Principles of Resuscitation (Cont’d)

- Factors associated with increased risk for neonatal resuscitation
  - Low birth rate, preterm
    - Intrapartum risk factors
      - Abruptio placentae
      - Placenta previa
      - Premature labor
      - Prolapsed cord
      - Prolonged rupture of membranes (>18 hours before delivery)
      - Prolonged labor (>24 hours)
      - Prolonged second stage of labor (>2 hours)

Newly Born Principles of Resuscitation (Cont’d)

- Newborn asphyxia
  - Inability of newborn to begin, continue breathing at birth
  - O2 deprivation
    - Breathe faster
  - Heart rate drops abruptly
  - Skin color progressively blue, then blotchy
  - Primary apnea
  - Secondary apnea
  - Hypoxia can lead to permanent brain damage
Factors associated with increased risk for neonatal resuscitation

- Congenital anomalies
  - Birth defects
  - Minor anomaly

- Major anomaly

Esophageal atresia and tracheoesophageal fistula (TEF)
  - Esophageal atresia, failure of esophagus to develop as a continuous passage
  - TEF, abnormal opening between trachea and esophagus
Newly Born Principles of Resuscitation (Cont’d)

- Factors associated with increased risk for neonatal resuscitation
  - Congenital anomalies
    - Esophageal atresia and TEF
      - Show EA symptoms first few hours
      - Chokes excessively
      - Choking, coughing, sneezing
      - Secretions, feedings pool in esophageal pouch

- Congenital anomalies
  - Esophageal atresia and TEF
    - Unable to advance orogastric/nasogastric tube
    - TEF, fluid spills over into trachea, cyanosis, wheezing, tachypnea, chemical pneumonitis
    - TEF without EA, chronic respiratory problems, repeated pneumonia

- Adequate oxygenation
- Constant airway monitoring
- Upright position prevents aspiration
- Suction
- Pulse oximeter, cardiac monitor
- Consult medical direction
- Transport
Factors associated with increased risk for neonatal resuscitation
- Congenital anomalies
  - Diaphragmatic hernia
    - Protrusion of abdominal contents into chest cavity through opening in diaphragm

Factors associated with increased risk for neonatal resuscitation
- Congenital anomalies
  - Diaphragmatic hernia etiology
    - Diaphragm defect, small slit/complete absence of diaphragm on affected side
    - Allows stomach, small intestine, spleen to invade the chest cavity
    - Lung severely affected, number of alveoli, bronchial branches decreased

Factors associated with increased risk for neonatal resuscitation
- Congenital anomalies
  - Respiratory distress
  - Breath sounds decreased
  - Bowel sounds in chest
  - Heart sounds displaced to ride side of chest
  - Cyanosis does not improve with ventilation
  - Abdomen scaphoid

Factors associated with increased risk for neonatal resuscitation
- Congenital anomalies
  - History and physical findings
    - Respiratory distress
    - Breath sounds decreased
    - Bowel sounds in chest
    - Heart sounds displaced to ride side of chest
    - Cyanosis does not improve with ventilation
    - Abdomen scaphoid
Factors associated with increased risk for neonatal resuscitation

Congenital anomalies

- Diaphragmatic hernia therapeutic interventions
  - \(O_2\)
  - Tracheal intubation before positive-pressure ventilation
  - Orogastric tube
  - Pulse oximeter, cardiac monitor
  - Consult medical direction
  - Transport

- Choanal atresia
  - Nare(s) narrowed/block by membranous/bony tissue
  - One side, unilateral atresia
  - Both sides, bilateral atresia

Unilateral Choanal Atresia
Newly Born Principles of Resuscitation (Cont’d)

- Factors associated with increased risk for neonatal resuscitation
  - Congenital anomalies
    - Choanal atresia history and physical findings
      - Respiratory distress
      - Gasping, cyanotic
      - Unable to feed and breathe at the same time
      - Retractions
      - Foul-smelling discharge from nose
      - Upper respiratory infections

- Pierre Robin sequence
Newly Born Principles of Resuscitation (Cont’d)

- Factors associated with increased risk for neonatal resuscitation
  - Congenital anomalies
    - Pierre Robin sequence history and physical findings
      - Airway obstruction
      - Lower jaw very small
      - Tongue large relative to jaw
      - Accessory muscles used to breathe
      - Retractions

- Factors associated with increased risk for neonatal resuscitation
  - Congenital anomalies
    - Pierre Robin sequence therapeutic interventions
      - May not have airway obstruction, verify open
      - If not open, insert oral airway
      - If unable, orogastric tube
      - Pulse oximeter, cardiac monitor
      - Consult medical direction immediately
      - Transport

- Meningomyelocele
  - Neural tube defects
  - Incomplete development of brain, spinal cord protective coverings
  - Spina bifida (SB)
  - SB meningocele
  - SB meningomyelocele
Factors associated with increased risk for neonatal resuscitation

- Congenital anomalies
  - Meningomyelocele
    - Spine does not close in first month of fetal development
    - Folic acid deficiency
  - Meningomyelocele history and physical findings
    - Higher defect on back, greater nerve damage, muscle function loss, sensation
    - Visible spinal defect
    - Flaccid paralysis of legs, altered bladder and bowel functions
    - No response to pain below defect
    - Clubfoot, hip dislocations
Newly Born Principles of Resuscitation (Cont’d)

- Factors associated with increased risk for neonatal resuscitation
  - Congenital anomalies
    - Meningomyelocele therapeutic interventions
    - Preventing infection, protecting exposed area from trauma
    - Do not place on back, position on side
    - Pulse oximeter, cardiac monitor
    - Early signs of increased intracranial pressure

Newly Born Principles of Resuscitation (Cont’d)

- Factors associated with increased risk for neonatal resuscitation
  - Congenital anomalies
    - Cleft lip and cleft palate
      - Cleft lip, incomplete closure of upper lip
      - Cleft palate, incomplete closure of hard/soft palate of mouth

Newly Born Principles of Resuscitation (Cont’d)

Cleft Lip and Palate
Newly Born Principles of Resuscitation (Cont'd)

- Factors associated with increased risk for neonatal resuscitation
  - Congenital anomalies
    - Cleft lip and cleft palate history and physical findings
      - Cleft lip on one/both sides
      - Cleft palate, occurs in midline, involves only uvula, one side, or extends into soft and hard palates
    - Congenital anomalies therapeutics interventions
      - Aspiration, anoxia obstruction
      - Position on side
      - Pulse oximeter, cardiac monitor
      - Medical direction
      - Transport
  - Omphalocele
    - Protrusion of abdominal organs into umbilical cord
    - Covered by sac of peritoneum
    - Umbilical vessels present within sac
Newly Born Principles of Resuscitation (Cont’d)

Omphalocele

Factors associated with increased risk for neonatal resuscitation

- Congenital anomalies
  - Omphalocele history and physical findings
    - Fat umbilical cord examined
    - May include stomach, intestines, liver, spleen
    - Rupture may occur immediately before, during birth

- Omphalocele therapeutic interventions
  - Preventing infection through exposed bowel; protect from trauma
  - Side position
  - Pulse oximeter, cardiac monitor
Newly Born Initial Steps of Resuscitation

- First impression
- Provide warmth
  - Cold stress, increased oxygen consumption, metabolic acidosis, hypoglycemia, apnea
  - Hypoxia, acidosis
  - Minimize heat loss

Newly Born Initial Steps of Resuscitation (Cont’d)

- Position and suction (Cont’d)
  - Sniffing position
  - Hyperextension/flexion, airway obstruction
  - Rolled washcloth, blanket, towel under shoulders
  - Determine the need for suctioning
  - Meconium considerations

Newly Born Initial Steps of Resuscitation (Cont’d)

- Stimulate
  - Rub back, trunk, extremities, tapping/flicking feet soles
  - Secondary apnea
  - Positive-pressure ventilation with bag-mask device
Newly Born Initial Steps of Resuscitation (Cont’d)

- Evaluate the need for O₂ administration

Newly Born Initial Steps of Resuscitation (Cont’d)

- Assess
  - Ventilatory effort

Newly Born Initial Steps of Resuscitation (Cont’d)

- Assess
  - Heart rate
    - 100-180 beats/min for first 12 hours
    - Listen to apical beat with stethoscope, feel pulse
      grasping base of umbilical cord
    - Pulse oximetry, cardiac monitor
    - <100 beats/min, begin positive-pressure ventilation
    - <60 beats/min, additional measures
    - Cardiac output, 500 mL/min
Newly Born Initial Steps of Resuscitation (Cont’d)

- Assess respirations, heart rate, and color
  - Color
    - Poor indicator
    - Acrocyanosis
    - Pallor

Newly Born Initial Steps of Resuscitation (Cont’d)

- Apgar scoring system
  - Do not delay resuscitation
  - Appearance
  - Pulse
  - Grimace
  - Activity
  - Respiratory effort

Newly Born Initial Steps of Resuscitation (Cont’d)

- Ventilation
  - Bag-mask needed for 2+ minutes, orogastric tube
  - Positive-pressure ventilation indications
  - Supplemental oxygen indications
  - Properly sized face mask
  - Ventilate lungs at 40-60 breaths/min
Newly Born Initial Steps of Resuscitation (Cont'd)

- Ventilation
  - Adequate ventilation
    - Gentle chest rise
    - Bilateral breath sounds
    - Improvement in heart rate

- Ventilation
  - Poor ventilation
    - Poor seal between face and mask
    - Poor alignment of head and neck
    - Insufficient ventilation pressure
    - Improper tracheal tube placement
    - Blocked airway
    - Gastric distention

- Ventilation
  - After adequate ventilation for 30 seconds, recheck heart rate and ventilatory effort
  - Consider tracheal intubation
Newly Born Initial Steps of Resuscitation (Cont’d)

- Chest compressions
  - Cardiac arrest risk factors
    - Intrauterine asphyxia
    - Prematurity
    - Drugs administered to mother
    - Congenital neuromuscular disease
    - Congenital malformations
    - Intrapartum hypoxemia

- Cardiac arrest causes
  - Primary apnea
  - Secondary apnea
  - Bradycardia
  - Persistent fetal circulation
  - Pulmonary hypertension
Newly Born Initial Steps of Resuscitation (Cont'd)

- Chest compressions
  - Risk factors for cardiac arrest
    - Intrauterine asphyxia
    - Prematurity
    - Drugs administered to mother
    - Congenital neuromuscular disease
    - Congenital malformations
    - Intrapartum hypoxemia

Newly Born Initial Steps of Resuscitation (Cont'd)

- Chest compressions
  - Thumb technique
    - Place thumbs side by side on sternum below nipple line

Newly Born Initial Steps of Resuscitation (Cont'd)

- Chest compressions
  - Two-finger method
Newly Born Initial Steps of Resuscitation (Cont’d)

- Chest compressions
  - Compression-to-ventilation ratio
  - Deliver compression smoothly
  - Compress one-third the anteroposterior diameter of chest
  - Compression to ventilation ratio, 3:1
  - Follow 3 compressions by a pause to ventilate
  - Allow the newborn’s chest to fully recoil during relaxation

- Tracheal intubation
  - Indications
    - Tracheal suctioning for meconium
    - Ineffective bag-mask ventilation
    - Chest compressions
    - Special resuscitation circumstances

- Endotracheal intubation
  - Blade selection
  - Tube size
  - After tube placement, check centimeter marking on tube at newborn’s upper lip
Newly Born Initial Steps of Resuscitation (Cont’d)

- Endotracheal intubation
  - Tube position confirmation
  - Sudden worsening after intubation
    - Dislodgement
    - Obstruction
    - Pneumothorax
    - Equipment

Newly Born Initial Steps of Resuscitation (Cont’d)

- Medications and fluids
  - Routes of medication administration
    - IV preferred
    - Umbilical vein catheterization only by specially trained

Newly Born Initial Steps of Resuscitation (Cont’d)

- Medications and fluids
  - Volume expanders
    - Bleeding, hypovolemia signs
  - Medications
    - Epinephrine for resuscitation
    - Glucose
    - Naloxone
Newly Born Initial Steps of Resuscitation (Cont'd)

- Postresuscitation care
  - Monitor heart rate, respiratory rate, BP, temperature, oxygen saturation
  - Maintain normal body temperature
  - Recheck blood sugar
  - Assess respiratory effort

- Detect possible complications of resuscitation
- Treat hypotension with volume expanders, vasodepressors
- Treat seizures
- Establish vascular access, fluid therapy
- Document observations, actions

Specific Newborn Situations

- Meconium aspiration
  - Collects in digestive tract of fetus, forms first stools
  - Thick, sticky, greenish/black
  - Contains swallowed amniotic fluid, mucus, fine hair, blood, bile
Specific Newborn Situations (Cont'd)

- Meconium aspiration
  - Presence, fetal distress
  - Hypoxia during birth, bowel movement
  - Inhaled
  - Complete/partial airway obstruction

- Meconium aspiration
  - Watery meconium may not require emergency care
  - Thick, particulate meconium
  - Aggressive airway management
  - Do not stimulate newborn to breathe
  - O₂, adequate perfusion
  - Warm the patient

Needle Chest Decompression
Specific Newborn Situations (Cont’d)

- **Apnea**
  - Prolonged, hypoxemia, bradycardia
  - Serious apnea
    - Breathing cessation longer than 20 seconds/any duration with cyanosis, sinus bradycardia
    - Risk factors
      - Prematurity
      - Drug exposure
      - Prolonged, difficult labor
  - Caused by hypoxia, hypothermia, ventilation defects, oxygen delivery disturbances, CNS depression
  - Stimulation
    - Flick soles of feet, rub back
    - Bag-mask device, oxygen
    - Disable pop-off valve, enough pressure to cause gentle chest rise
    - Suction
    - Chest compressions
  - ET Intubation
    - Heart rate <60 beats/min despite bag-mask, chest compressions
    - Prolonged positive-pressure ventilation
    - Prolonged apnea
    - Central cyanosis despite adequate ventilation
    - Confirm tube placement
    - Pulse oximeter, cardiac monitor
    - Maintain normal body temperature
    - IV line, intraosseous infusion, umbilical vein catheter
    - Check glucose level
Specific Newborn Situations (Cont'd)

- Bradycardia
  - Slower heart rate
  - Primary caused by structural heart disease
  - Secondary bradycardia, slow heart rate from noncardiac cause
  - Cardiac output = stroke volume × heart rate

Specific Newborn Situations (Cont'd)

- Bradycardia
  - Causes
    - Upper airway obstruction
    - Secretions/foreign body
    - Tongue position
    - Assess respiratory rate, effort
    - Assess pulse rate, quality

Specific Newborn Situations (Cont'd)

- Bradycardia
  - Treatment
    - Correct hypoxia
    - Ensure open airway
    - Suction
    - Pulse oximeter, oxygen
    - Positive-pressure ventilation
    - Chest compressions if heart rate <60 beats/min despite adequate ventilation with supplemental oxygen for 30 seconds
    - IV, epinephrine
Specific Newborn Situations (Cont'd)

- Prematurity
  - Weighs 0.6-2.2 kg/1.3-4.5 lb or born before week 37

Specific Newborn Situations (Cont'd)

- Prematurity
  - Respiratory suppression
  - Hypoglycemia
  - Hypothermia
  - Infection
  - Head/brain injuries caused by hypoxemia
  - BP changes

Specific Newborn Situations (Cont'd)

- Prematurity
  - Intraventricular hemorrhage
  - Serum osmolarity fluctuations
  - Large trunk, short extremities
  - Transparent skin, less wrinkles, subcutaneous fat
  - Resuscitate
  - Open airway

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Specific Newborn Situations (Cont’d)

- Prematurity
  - Bag-mask device, oxygen
  - Chest compressions
  - Body temperature
  - Pulse oximeter, cardiac monitor
  - IV access
  - Transport

- Respiratory distress and cyanosis
  - Prematurity
  - Immature respiratory control center
  - Respiratory distress <1200 g (2.6 lb), <30 weeks gestation

Specific Newborn Situations (Cont’d)

- Respiratory distress and cyanosis
  - Assessment in respiratory distress
    - Tachypnea
    - Paradoxic breathing
    - Periodic breathing
    - Intercostal retractions
    - Nasal flaring
    - Expiratory grunt
Specific Newborn Situations (Cont’d)

- Respiratory distress and cyanosis
  - Airway is first priority
  - Suction
  - Pulse oximeter, oxygen saturation above 95%
  - Bag-mask device

Specific Newborn Situations (Cont’d)

- Respiratory distress and cyanosis
  - Tracheal intubation
  - Chest compressions
  - Glucose level
  - Normal body temperature

Specific Newborn Situations (Cont’d)

- Seizures
  - Underlying abnormality sign
  - Causes
    - Hypoxic-ischemic encephalopathy
    - Intracranial bleeding
    - CNS infection
    - CNS malformation
    - Metabolic disturbances
    - Drug withdrawal
    - Developmental abnormalities
    - Amino and organic acid metabolism disorders
Specific Newborn Situations (Cont'd)

- Seizures
  - Subtle
  - Tonic
  - Clonic
  - Myoclonic

Specific Newborn Situations (Cont'd)

- Airway, adequate oxygenation
- Suction
- O₂, ventilation
- ECG
- Glucose level
- Side position
- Normal body temperature
- Transport

Specific Newborn Situations (Cont'd)

- Fever
  - Rectal temperature >38.0°C (100.4°F)
  - Weakens newborn
  - Uses more glucose
  - Dehydration
  - Immature immune system, infections
Specific Newborn Situations
(Cont'd)

- Fever
  - Causes
    - Upper respiratory infection
    - Lower respiratory infection
    - Sepsis
    - Meningitis
    - Urinary tract infection
    - Ear infection
    - Gastroenteritis

Specific Newborn Situations
(Cont'd)

- Fever
  - Mental status changes
  - Skin pink, mottled, ashen, pale
  - Rash, petechiae
  - Supportive treatment

Specific Newborn Situations
(Cont'd)

- Fever
  - Open airway, breathing adequate
  - Chest compressions
  - Do not use ice/cold water baths
  - IV, fluids
Specific Newborn Situations (Cont’d)

- Hypothermia
  - Heat reduction decrease, heat loss increase
  - Sign of sepsis
  - Metabolic acidosis, pulmonary hypertension, hypoxemia

Specific Newborn Situations (Cont’d)

- Hypothermia
  - Environmental conditions
    - Evaporation
    - Conduction
    - Convection
    - Radiation

Specific Newborn Situations (Cont’d)

- Hypothermia
  - Signs/symptoms
    - Pale color
    - Cool skin
    - Acrocyanosis
    - Slow, shallow respiratory effort, apnea
    - Bradycardia
    - Central cyanosis
    - Irritability, lethargy
Specific Newborn Situations (Cont’d)

- Hypothermia
  - Open airway, adequate breathing
  - Assist ventilations
  - Chest compressions
  - Dry skin, wrap in warm blankets
  - Check glucose level
  - IV fluids

Specific Newborn Situations (Cont’d)

- Hypoglycemia
  - <40 mg/dL glucose level
  - Irreversible brain damage

Specific Newborn Situations (Cont’d)

- Hypoglycemia
  - Risk factors
    - Maternal diabetes
    - Preterm birth
    - Hypoxia, asphyxia
    - Hypothermia
    - Small for gestational age infant
  - Sepsis
    - Toxemia
    - Smaller twin
    - CNS hemorrhage
    - Respiratory distress
Specific Newborn Situations (Cont'd)

- Hypoglycemia
  - Signs/symptoms
    - Jitteriness, twitching, or seizures
    - Cyanosis
    - Respiratory distress
    - Limpness
    - Eye rolling
    - Lethargy
    - High-pitched cry
    - Apnea
    - Irregular respirations

Specific Newborn Situations (Cont'd)

- Vomiting
  - Pyloric stenosis
  - Increased intracranial pressure
  - Duodenal ulcer
  - Stress ulcer
  - Overfeeding
  - Ineffective burping
  - Milk allergy

Specific Newborn Situations (Cont'd)

- Vomiting
  - Vomitus with dark blood, serious illness
  - Aspiration
  - Vomitus of non-bile-stained fluid, anatomic/functional obstruction, GI reflux
Specific Newborn Situations
(Cont’d)

- Vomiting
  - Distended stomach, signs of infection, increased intracranial pressure, drug withdrawal
  - Open airway
  - Suction, ensure adequate breathing
  - Pulse oximeter, O₂
  - Positive-pressure ventilation
  - Side position
  - Cardiac monitor

Specific Newborn Situations
(Cont’d)

- Diarrhea
  - Causes
    - Overfeeding
    - Bacterial or viral infection
    - Gastroenteritis
    - Lactose intolerance
    - Phototherapy treatment
    - Neonatal abstinence syndrome
    - Thyrotoxicosis
    - Malabsorption
    - Cystic fibrosis

- Normal stool pattern changes
- Dehydration, electrolyte imbalance
- Overfeeding
Specific Newborn Situations (Cont'd)

- Diarrhea
  - Neonatal abstinence syndrome
    - Narcotic-addicted mothers
    - Withdrawal symptoms begin within 48-72 hours
    - Phototherapy, thyrotoxicosis

Specific Newborn Situations (Cont'd)

- Diarrhea
  - Standard precautions
  - Dehydration signs
  - Open airway, adequate breathing
  - Pulse oximeter, oxygen
  - Chest compressions
  - Cardiac monitor
  - IV fluids

Specific Newborn Situations (Cont'd)

- Birth injuries
  - Risk factors
    - Cephalopelvic disproportion
    - Shoulder dystocia
    - Prolonged, difficult labor
    - Abnormal presentations
Specific Newborn Situations (Cont’d)

- Birth injuries
  - Cranial injuries
    - Molding of head, overriding of parietal bones
    - Redness, abrasions, bruising, subcutaneous fat necrosis
    - Subconjunctival, retinal hemorrhage
    - Subperiosteal hemorrhage
    - Skull fracture

- Birth injuries
  - Assessment findings
    - Diffuse, ecchymotic swelling of scalp soft tissues
    - Paralysis below level of spinal cord injury
    - Paralysis of upper arm with/without paralysis of forearm
    - Paralysis of diaphragm

- Birth injuries
  - Assessment findings
    - One-sided face movement when crying
    - Lack of free arm movement on fractured clavicle side
    - Lack of spontaneous movement of affected extremity
    - Hypoxia
    - Shock
Specific Newborn Situations (Cont'd)

- Birth injuries
  - Adequate oxygenation, ventilation
  - Chest compressions
  - Normal body temperature
  - Medical direction
  - Transport

Chapter Summary

- Although fewer than 10% of newborns require emergency care, you must always be prepared for newborn resuscitation when assisting with delivery
- Some conditions increase the likelihood that resuscitation will be necessary

Chapter Summary (Cont'd)

- Usually, drying, warming, and suctioning are sufficient to cause the newborn to breathe effectively; they may be the only resuscitative measures needed
  - If additional care is required, you must know how to manage the newborn’s airway, assist in ventilations, perform chest compressions, establish vascular access, and give medications
Chapter Summary (Cont’d)

- Be aware of the capabilities of hospitals in the area to determine the most appropriate destination for healthy and high-risk newborns
- Although care will be focused on the newborn, remember to explain what you are doing to family members as you provide care

Questions?