NURSING MANAGEMENT OF THE NEWBORN AT RISK: Utilizing the Nursing Process and Critical Thinking

Lecture Objectives:

1. Describe risk factors associated with the birth and transition of an infant of a diabetic mother.
2. Discuss maternal substance abuse and the newborn.
3. Identify the principles of high risk infant care in meeting the special needs of the preterm newborn.
4. Discuss gestational problems in the neonate.
5. Discuss infection and the newborn.

Lecture Objectives: (cont.)

- Discuss hemolytic disorder in the newborn.
- Develop a plan of care to meet the needs of parent's of high risk infants.
- Discuss the treatment and complications of respiratory distress syndrome.
- Describe nursing interventions for nutritional care of the preterm infant.
- Discuss thermoregulation and it's role in the care of the preterm infant.
Reading Assignment:


Infants with Gestational Age–Related Problems

- Infants who are born considerably before term and survive are particularly susceptible to development of sequelae related to preterm birth
  - Necrotizing enterocolitis
  - BPD
  - Intraventricular and periventricular hemorrhage
  - Retinopathy of prematurity
High Risk Newborn

- High risk infant classification
- Birth weight
- Gestational age
- Predominant pathophysiologic problems

Preterm Infants

- Organ systems are immature and lack adequate physiologic reserves to function in extrauterine environment
- Potential problems and needs of preterm infant weighing 2000 g differ from those of term, postterm, or postmature infant of equal weight
- Physiologic disorders and anomalies affect infant’s response to treatment

Preterm Infants

- Closer infants are to term, the easier their adjustment to external environment
- Varying opinions exist about practical and ethical dimensions of resuscitation of extremely low-birth-weight infants
- Birth weight is 1000 g or less
Care Management

- Assessment
  - Respiratory function
  - Cardiovascular function
  - Maintaining body temperature
  - Central nervous system function
  - Maintaining adequate nutrition
  - Maintaining renal function
  - Maintaining hematologic status

Care Management

- Assessment (cont’d)
  - Protection from infection
  - Skin care
- Growth and development potential
- Parental adaptation to preterm infant
  - Parental tasks
  - Parental responses
  - Parenting disorders

Care Management

- Plan of care and implementation
  - Physical care
  - Maintaining body temperature
    - Warming the hypothermic infant
    - Weaning infant from incubator
  - Oxygen therapy
    - Oxygen hood
    - Nasal cannula
    - Continuous positive airway pressure (CPAP)
Care Management

- Plan of care and implementation
  - Oxygen therapy (cont’d)
    - Mechanical ventilation
    - Surfactant administration
    - Extracorporeal membrane oxygenation therapy (ECMO)
    - High-frequency ventilation
    - Nitric oxide therapy

Care Management

- Plan of care and implementation (cont’d)
  - Weaning from respiratory assistance
  - Nutritional care
    - Types of nourishment
      - Weight and fluid loss or gain
    - Hydration
      - Insensible water loss (IWL)
    - Elimination patterns
    - Oral feeding

Care Management

- Plan of care and implementation
  - Nutritional care (cont’d)
    - Gavage feeding
    - Gastronomy feeding
    - Advancing infant feedings
    - Nonnutritive sucking
Care Management

- Plan of care and implementation (cont'd)
  - Environmental concerns
  - Developmental care
    - Positioning
    - Reducing inappropriate stimuli
    - Infant communication
    - Infant stimulation
    - Kangaroo care

Care Management

- Plan of care and implementation (cont'd)
  - Parental support
  - Parent education
    - Cardiopulmonary resuscitation

Complications of Prematurity

- Respiratory distress syndrome (RDS)
- Patent ductus arteriosus (PDA)
- Periventricular-intraventricular hemorrhage
- Necrotizing enterocolitis
- Complications of oxygen therapy
  - Retinopathy of prematurity (ROP)
  - Bronchopulmonary dysplasia (BPD)
The Postmature Infant

- Meconium aspiration syndrome (MAS)
- Persistent pulmonary hypertension of the newborn (PPHN)

Other Problems Related to Gestation

- Small for gestational age (SGA) and intrauterine growth restriction (IUGR)
  - Perinatal asphyxia
  - Hypoglycemia
  - Heat loss

Other Problems Related to Gestation

- Large for gestational age (LGA) (weighing more than 4000 g at birth)
  - Birth trauma serious hazard
    - With breech or shoulder presentation
    - Asphyxia or CNS injury
    - Oversized infant at risk due to size
Other Problems Related to Gestation

- Infants of diabetic mothers
  - Pathophysiology
  - Congenital anomalies
  - Macrosomia
  - Birth trauma and perinatal asphyxia
  - Respiratory distress syndrome
  - Hypoglycemia
  - Hypocalcemia and hypomagnesemia

Other Problems Related to Gestation

- Infants of diabetic mothers (cont’d)
  - Cardiomyopathy
  - Hyperbilirubinemia and polycythemia
  - Nursing care

Discharge Planning

- Home care needs of infant’s parents are assessed
- Information provided about infant care
- Referrals for appropriate resources
- Referrals for home health assistance
- Transport to regional center
Key Points

- Preterm infants at risk for problems related to the immaturity of their organ systems
- Respiratory distress syndrome, retinopathy of prematurity, and chronic lung disease (bronchopulmonary dysplasia) are associated with prematurity
- High risk infants must be observed for respiratory distress and other early signs of physiologic distress

Key Points

- Metabolic abnormalities of diabetes mellitus adversely affect embryonic and fetal development
- Adaptation of parents to preterm or high risk infants differs from that of parents of full-term infants
- Parents need special instruction (e.g., CPR, oxygen therapy, suctioning, developmental care) before they take a high risk infant home

Key Points

- Infants born to diabetic mothers are at risk for hypoglycemia and RDS
- SGA infants are considered to be at risk because of fetal growth restriction
- Nonreassuring fetal status among postmature infants is related to progressive placental insufficiency that can occur in postterm pregnancy
Key Points

- Specially trained nurses may transport high risk infants to and from special care units

The Newborn at Risk: Acquired and Congenital Problems

Acquired and Congenital Problems

- Conditions or circumstances superimposed on normal course of events associated with birth and adjustment to extrauterine existence
- Birth trauma includes physical injuries sustained during labor and birth
- Congenital anomalies: gastrointestinal (GI) malformations, neural tube defects, abdominal wall defects, and cardiac defects
Birth Trauma

- Injury sustained during labor and birth
- Birth injuries may be avoidable
  - Careful assessment of risk factors and appropriate planning of birth
  - Ultrasonography allows antepartum diagnosis of macrosomia, hydrocephalus, and unusual presentations
  - Elective cesarean birth chosen for some pregnancies to prevent significant birth injury

Birth Trauma

- Small percentage of significant birth injuries are unavoidable despite skilled and competent obstetric care
  - Especially with difficult or prolonged labor
  - When the infant is in an abnormal presentation
  - Some injuries cannot be anticipated until the circumstances are encountered during childbirth

Birth Trauma

- Care management
  - Skeletal injuries
  - Peripheral nervous system injuries
    - Brachial paralysis
    - Facial paralysis
    - Phrenic nerve injury
Birth Trauma

- Care management (cont’d)
- Central nervous system injuries
  - Intracranial hemorrhage (ICH)
  - Subdural hematoma
  - Subarachnoid hemorrhage
  - Spinal cord injuries

Neonatal Infections

- Sepsis
  - Bacterial, viral, fungal
  - Patterns
    - Early onset or congenital
    - Nosocomial infection—late onset
  - Septicemia
  - Pneumonia
  - Bacterial meningitis
  - Gastroenteritis is sporadic

Neonatal Infections

- Assessment
- Plan of care/implementation
- Care management
Neonatal Infections

- TORCH infections
  - Toxoplasmosis
  - Gonorrhea
  - Syphilis
  - Varicella-zoster
  - Hepatitis B virus (HBV)
  - Human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS)

Neonatal Infections

- TORCH infections (cont’d)
  - Rubella infection
  - Cytomegalovirus infection (CMV)
  - Herpes simplex virus (HSV)
  - Parvovirus B19

Neonatal Infections

- Bacterial infections
  - Group B streptococcus
  - *Escherichia coli*
  - Tuberculosis
  - Chlamydia
  - Fungal infections
  - Candidiasis
Substance Abuse

- Alcohol
  - Fetal alcohol syndrome
- Tobacco
- Marijuana
- Cocaine
- Phencyclidine (PCP, or “angel dust”)
- Heroin
- Methadone

Substance Abuse

- Miscellaneous substances
  - Methamphetamines
  - Phenobarbital
  - Caffeine

Critical Periods in Human Embryogenesis
Hemolytic Disorders
• Hemolytic disease occurs when blood groups of mother and newborn are different
  • Most common
    • Rh incompatibility
    • ABO incompatibility
  • Occur when maternal antibodies are present naturally, or form in response to antigen from fetal blood crossing placenta and entering maternal circulation

Hemolytic Disorders
• Maternal antibodies of IgG class cross placenta, causing hemolysis of fetal RBCs
  • Fetal anemia
  • Neonatal jaundice
  • Hyperbilirubinemia

Hemolytic Disorders
• Rh incompatibility (isoimmunization)
  • Only Rh-positive offspring of Rh-negative mother is at risk
  • If fetus is Rh positive and mother Rh negative, mother forms antibodies against fetal blood cells
Hemolytic Disorders

- ABO incompatibility
  - Occurs if fetal blood type is A, B, or AB, and maternal type is O
  - Incompatibility arises because naturally occurring anti-A and anti-B antibodies are transferred across placenta to fetus
  - Exchange transfusions required occasionally

- Other hemolytic disorders
  - Glucose-6-phosphate dehydrogenase deficiency (G-6-PD)
  - Other metabolic and inherited conditions that increase hemolysis and may cause jaundice in infant
    - Galactosemia
    - Crigler-Najjar disease
    - Hypothyroidism

Congenital Anomalies

- Most common major congenital anomalies that cause serious problems in neonate are:
  - Congenital heart disease
  - Neural tube defects
  - Cleft lip or palate
  - Clubfoot
  - Developmental dysplasia of the hip
Congenital Anomalies

- Central nervous system anomalies
  - Encephalocele and anencephaly
  - Spina bifida
  - Hydrocephalus
  - Microcephaly

Congenital Anomalies

- Cardiovascular system anomalies
  - Congenital heart defects (CHDs)
    - Anatomic abnormalities in the heart
    - Present at birth, although not diagnosed immediately

Congenital Anomalies

- Respiratory system anomalies
  - Choanal atresia and laryngeal web
  - Congenital diaphragmatic hernia
Congenital Anomalies

- Gastrointestinal system anomalies
  - Cleft lip and palate
  - Esophageal atresia and tracheoesophageal fistula
  - Omphalocele and gastroschisis
  - Gastrointestinal obstruction
  - Imperforate anus

Congenital Anomalies

- Musculoskeletal system anomalies
  - Developmental dysplasia of the hip
    - Acetabular dysplasia or preluxation
    - Subluxation
    - Dislocation

Congenital Anomalies

- Musculoskeletal system anomalies (cont’d)
  - Clubfoot
    - Talipes varus—inversion or bending inward
    - Talipes valgus—eversion or bending outward
    - Talipes equinus—plantar flexion in which toes are lower than heel
    - Talipes calcaneus—dorsiflexion in which toes are higher than heel
Congenital Anomalies

- Musculoskeletal system anomalies (cont'd)
  - Polydactyly
    - Hands or feet with extra digits
  - Hereditary

- Genitourinary system anomalies
  - Hypospadias and epispadias
  - Exstrophy of the bladder
  - Ambiguous genitalia
  - Teratoma

Care Management

- Genetic diagnosis
- Newborn screening
  - Phenylketonuria
  - Galactosemia
  - Hypothyroidism
- Cytologic studies
- Dermatoglyphics
Key Points

- Identification of maternal and fetal risk factors in antepartum and intrapartum periods is vital for planning adequate care of high risk infants
- Small percentage of significant birth injuries may occur despite skilled and competent obstetric care
- Metabolic abnormalities of diabetes mellitus in pregnancy adversely affect embryonic and fetal development

Key Points

- Infection in newborn may be acquired:
  - In utero
  - At birth
  - In breast milk
  - Within nursery
- Most common maternal infections associated with congenital malformations represented by acronym TORCH

Key Points

- HIV transmission from mother to infant occurs:
  - Transplacentally at various gestational ages
  - Perinatally by maternal blood and secretions
  - By breast milk
- Preterm infants are at risk for problems related to the immaturity of organ systems
- Hyperbilirubinemia has variety of etiologic factors, including maternal-fetal Rh and ABO incompatibility
Key Points

- Injection of Rho(D) immune globulin in Rh-negative and Coombs’ test–negative women minimizes possibility of isoimmunization
- Nurse often observes signs of newborn drug withdrawal and neonatal abstinence syndrome, and obtains information from maternal history
- Major congenital defects are now the leading cause of death in term neonates

Key Points

- Curative and rehabilitative problems of a child with a congenital disorder are often complex, requiring multidisciplinary approach to care

Key Points

- Parents often need special instructions before they take home a high risk infant
  - Cardiopulmonary resuscitation (CPR)
  - Oxygen therapy
  - Nutrition requirements
- Supportive care given to parents of infants with an abnormal condition must begin at birth or at time of diagnosis and continue for years