N201 – Special Populations
High Risk Neonate- SGA, LGA, Post-Mature

Overview

I. Data collection
   A. Maternal history
   B. Risk factors present
   C. Gestational age
   D. Labor and delivery course

II. Anticipate Problems and care needs
   - Who is the high risk infant?
     - Pre-Term
     - Term
     - Post-Term
     - SGA
     - AGA
     - LGA

III. Assessment

IV. Resuscitation

V. Ongoing monitoring and care
   A. NTE
   B. Maintain skin integrity
   C. Prevent infection
      1.
      2.
   D. Respiratory care
   E. Pulse oximetry
   F. Nutritional support
   G. Parental care

VI. Transport
   A. Regionalization and specialization

   B. Best transport vehicle is the mother most of the time
   C. Parent care
      1.
      2.

VII. NICU
   A. Concentrates equipment and highly trained staff
   B. Nursery classifications – opposite of Trauma classifications
      1. Level I –
      2. Level II –
      3. Level III –

SGA

- Small for Gestational Age
- An infant whose rate of intrauterine growth was slowed and whose birth weight falls below the _____ on intrauterine growth curves.
- IUGR= Intrauterine Growth Restriction= found in infants whose intrauterine growth is restricted (interchangeable with SGA)

I. Pathophysiology
   1. Symmetrical (Hypoplasia)
      - Growth restriction in which the weight, length, and head circumference are all affected
      - Deficient number of cells- each has a normal cytoplasm
      - Result of growth deficit early in gestation, during period of organ development when cellular division is greatest
      - Organs are small and organ weight is decreased
   2. Asymmetrical (late IUGR)
      - Growth restriction in which the head circumference remains within normal parameters while the birth weight falls below the 10^{th} percentile
      - Total number of cells is normal, cell <u>size</u> is small- reduced size of cytoplasm
      - Cells have not received adequate nutrition
      - Result of growth deficit late in pregnancy

II. Causes
   1. Maternal Factors- disease or conditions that affect supply of O2 and/or nutrients to fetus either directly or through insufficient function of the placenta
      a. Maternal Hypertensive Disorders (Preeclampsia, eclampsia, chronic hypertension)- decreased blood flow to placenta
      b. Maternal heart or lung disease – decrease PO2 and/or blood flow to placenta
      c. Cigarette smoking or exposure to smoke (second-hand smoke)- decreases PO2 & blood flow
      d. Maternal drug use, especially alcohol and cocaine
      e. Maternal malnutrition- decrease nutrients to fetus
      f. Maternal anemia- decreased nutrients and O2 carrying capacity
      g. Living at high altitude- decreases O2 tension
      h. Low socioeconomic status- affects healthcare, nutrition status

   2. Placental Factors- conditions of the placenta affecting vascular delivery to the fetus
      - Placental insufficiency (including placental aging)
      - Abnormal cord insertions- velamentous cord insertion
      - Single umbilical artery- less travel of nutrients and O2 to baby
      - Placental infarct- portion of placenta has died

   3. Fetal Factors-
      - Intrauterine infections- rubella, CMV, toxoplasmosis
      - Multiple gestation
      - Congenital malformations- Down's, Trisomy 13, Trisomy 18, inborn error of metabolism

III. Characteristics
   1. Size:

2. Head:
    - Sutures:
    - Fontanels:
3. Hair:
4. Musculature:
5. Skin:
6. Abdomen:
7. Cord:
8. Gastric Size:
9. Cry:
10. Appearance:

IV. Prenatal Care
1. Diagnosis- suspect when fundal height less than expected or decreased weight gain
2. Management- monitor weight gain, fundal height, serial sonograms, NST, BPP
3. Delivery- early delivery when infant risk is greater if remains in utero vs prematurity

V. Complications
1. Birth asphyxia and related complications
    - Chronic hypoxia leads to little reserve for labor resulting in high risk for birth asphyxia, which may cause respiratory distress complicated by apnea.

    VI. Significant asphyxia at birth may even lead to fetal death
    - Risk for meconium aspiration syndrome
    - Persistent pulmonary hypertension- occurs after hypoxic insult to neonate resulting in vasoconstriction and increased pulmonary vascular resistance
        - Increased pulmonary arterial pressure increases right ventricular pressure greater than systemic pressure = right to left shunt= decreased O2 of blood to lungs= hypoxemia, cyanosis

2. Hypothermia
    - Decreased subcutaneous fat
    - Depletion of brown fat
    - Large surface area
    - Vulnerable to cold stress

3. Polycythemia
    - Compensatory mechanism r/t chronic hypoxia
    - HCT >60% increases blood viscosity
    - Results in increased cardiac workload, decreased tissue perfusion
    - S&Sx:

- Treatment: partial exchange transfusion of plasma

4. Metabolic problems
    - Hypoglycemia- decreased stores, decreased supply of enzymes necessary for gluconeogenesis (conversion of fats to glucose)
    - Hypocalcemia- occurs with hypoglycemia
    - Hyperbilirubinemia- results from polycythemia, may also occur r/t hemolysis of RBC's from infection

5. Cardiac problems
    - Congenital heart defects especially PFC & PDA

6. Nutritional problems
    - Increased metabolic activity vs. premature due to increased O2 consumption due to increased % of body weight made up by visceral organs
    - Gastric capacity:

7. Immunologic problems
    - Cause of SGA may have been r/t congenital viral infection
    - Pregnant women should avoid caring for this infant If this is the suspected cause

8. Congenital anomalies
    - 10-20x as many congenital anomalies than AGA infants
    - Low incidence of major neurological defects
    - Congenital heart problems in 6% of infants
    - The greater the IUGR, the greater the chance for malformations

VII. Prognosis

1. Mortality- Mortality rate >10%
    - Higher for SGA vs AGA, better than for premies

2. Leading cause of death= perinatal asphyxia

3. Long-term effects- ability to "catch up"
    - Symmetrical- limited growth potential (limited ability to catch up) esp if undergrown in all three areas: head, chest, and length
    - Asymmetrical- potential for growth, usually catch up at 3-6 months of age

4. Learning difficulties- asphyxia and poor brain growth associated with IUGR leads to frequent learning difficulties
    - Specific problems: hyperactivity disorders, short attention span, poor fine motor coordination, some hearing loss, speech deficits

5. Socioeconomic influences- some studies show if born into high socioeconomic level= to peers at age 10-12 y/o; if born into low socioeconomic family= usually function below peers

LGA

- Large for Gestational Age
- Infant whose birth weight falls above the _____ on intrauterine growth charts

I. Predisposing Factors
   1. Genetic predisposition
   2. Multiparous (3x as likely as a primigravida)
   3. Males traditionally larger than females
   4. Infant of Diabetic Mother (IDM)
   5. Erythroblastosis fetalis
   6. Transposition of Great Vessels
   7. "Some" post term infants

II. Complications
   1. Birth trauma
      - CPD, phrenic nerve palsy, asphyxia related brain injury, fractured clavicle, etc
   2. Hypoglycemia
      - R/T increased utilization of stores, increased metabolic rate
      - Feed early
      - Blood sugar screening protocols
   3. Polycythemia
      - Pos due to poor tissue perfusion- body attempts to fully oxygenate all tissues
   4. Hyperbilirubinemia
      - From bruising from birth trauma
      - Polycythemia

Post-Term Infants

A. Infant delivered after _____ weeks confirmed gestation
B. Risk progressive placental insufficiency
C. Characteristics
   1.
   2.
   3.
   4.
   5.
   6.
   7.
   8.
   9.
   10.

D. Antepartum Management
   1.
   2.
   3. Close surveillance with _____ or _____ BPPs & NSTs
   4. Evidence of threat to fetus- C-Section
   5. Induction usually recommended after 40 weeks

E. Hazards
   1. Dangers to fetus from diagnostic procedures
      - CST
      - Amniocentesis

   2. Poor tolerance of labor
      - Decreased energy stores
      - Intrauterine asphyxia
      - Fetal distress (late decelerations, poor variability)

   3. Increased risk meconium aspiration

   4. Increased risk of intracranial hemorrhage, fractures

   5. SGA r/t deteriorating exchange of aging placenta= fetal malnutrition= hypoxia= wasted appearance

F. Complications with Post-Maturity (whether AGA or SGA)

1. Hypoglycemia- stores have been used up intrauterine

2. Respiratory- intrauterine hypoxia, meconium aspiration

3. Thermoregulation
    - Cold stress
    - Depleted subcutaneous fat and glycogen stores
    - Large body surface- limp posture

4. CNS complications- trauma (if CPD), seizure activity (hypoxia, hypoglycemia)

5. Increased incidence of congenital anomalies

6. Infections due to peeling and cracking skin

G. Prognosis
    1. Decreased oxygen and nutrients in the last weeks may affect newborn
    2. Risk neuro sequale- difficulty with fine motor tasks