Common Newborn Issues

Learning Objectives

Discuss common newborn assessment and management of the following issues:

1. Initial newborn evaluation
2. Nutrition
3. Respiratory and cardiac
4. Foot and hip
5. Hyperbilirubinemia
6. Gastrointestinal
7. Infectious disease
8. Sudden infant death syndrome
9. Failure to thrive
10. Lacrimal duct obstruction

Evaluation of the Newborn

- APGAR scores
- Height/weight/head circumference/gestational dating
- Heart/lungs: sounds, murmurs, pulses, color
- Abdomen: cord, hernias, organomegaly
- Genitalia: palpable testicles, penis, labia, position of anus or perforate anus
- Hips: Ortolani maneuver
- Long bones: for fractures
- HEENT: red reflex, palate
- Neurologic and skin
- Watch feeding, activity, and temperature regulation

Apgar Score

<table>
<thead>
<tr>
<th>Score of 0</th>
<th>Score of 1</th>
<th>Score of 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complexion</td>
<td>blue or pale all over</td>
<td>blue at extremities, pink (acrocyanosis)</td>
</tr>
<tr>
<td>Pulse rate</td>
<td>0 &lt;100</td>
<td>≥100</td>
</tr>
<tr>
<td>Reflex irritability</td>
<td>no response to stimulation</td>
<td>grimace/feeble cry</td>
</tr>
<tr>
<td>Muscle tone</td>
<td>none</td>
<td>some</td>
</tr>
<tr>
<td>Breathing</td>
<td>absent</td>
<td>weak, irregular, gasping</td>
</tr>
</tbody>
</table>

Newborn Hearing

- 2008 The USPSTF recommends screening for hearing loss in all newborn infants (B rec)
- Most common cause of hearing loss in newborns is genetic
- Two tests: Otoacoustic emissions and Auditory brain stem response
- Risks: Family history of sensorineural hearing loss, delayed language, prematurity, meningitis, chronic otitis, and parental perception of a problem

1. If infants only receive breast milk, what supplement should they receive?
   A. Vitamin D
   B. Multivitamins
   C. Iron
   D. Calcium

© American Academy of Family Physicians. All Rights Reserved.
1. If infants only receive breast milk, what supplement should they receive?

A. Vitamin D  
B. Multivitamins  
C. Iron  
D. Calcium

Vitamin D

- Breast milk contains small amounts of vitamin D (<25IU/L)
- AAP (2008)
  - Breastfed infants should have 400 IU Vitamin D/day starting in first few days of life
  - Poly-Vi-Sol and most infant vitamins contain 400 IU (although some do have 200 IU)
  - Need 1 L or 33 oz. formula

Feeding and Nutrition

- Breastfeeding: best food, recommended for 1 yr
  - Protection from infectious disease
  - Reduction in atopic diseases
  - Protection from SIDS
  - Preterm infant: protection from NEC and sepsis, more protein and higher IQ
  - Mother protected from breast and ovarian CA and postmenopausal osteoporosis
  - Increased physiological jaundice
  - Rare: failure to thrive, dehydration, rickets, mastitis
- Contraindications: galactosemia, maternal conditions (HIV, TB, syphilis, malaria), medications/chemo
- Beginning at few days of age supplement with vitamin D 400 IU/day

Breastfeeding Evidence

- Providers should have structured breastfeeding education and behavioral counseling in order to promote breastfeeding in newborns.
  - Level B
- Water usually not required
- Breastfed infants will have different growth curves

Feeding

- Bottle-feed with iron-containing formula
- Bottles and nipples do not require sterilization
- Formula at room temp, not in microwave
  - Iron (10-12 mg/l), “low iron” not recommended
  - Cow’s milk: not until after 1 year
  - Soy: not as allergenic, vegetarian
- Starting foods
  - Cereals (4-6 months)
  - Vegetables and fruits
  - Table foods
- No honey for first year

Storage and Handling of Breast Milk

- May be safely stored up to 4-10 hours at room temperature
- May be stored up to 4-8 days in the refrigerator
- May be frozen for up to 3-6 months
- After freezing, should be thawed slowly and not refrozen
Other Newborn Parental Concerns

- Wet diapers ≥ 6/day
- Stools 1-3/day
  - More often in breastfed babies
  - Constipation = delay or difficulty for > 2 weeks
  - Treat with fruit juice, increased fluids, or glycerin suppositories
- Umbilical cord, clean with saline
- Rashes: neonatal acne (acne neonatorum), erythema toxicum neonatorum
- Clean genitals with warm water
- Regain birth weight by 14 days

Respiratory Distress

- Transient tachypnea of the newborn (TTN) resp rate > 60/min
  - CXR—diffuse parenchymal infiltrates and fluid in the pulmonary fissures
  - 93% resolve in 2 hours; may last for 2 days
  - Most common cause of respiratory distress (>40%)
  - Diagnosis of exclusion
  - Treatment is supportive (oxygen)
- Other common causes:
  - Respiratory distress syndrome in premature infants
  - Meconium aspiration
  - Pneumonia

2. The most common form of congenital heart disease is:

A. Ventricular septal defect
B. Patent ductus arteriosus
C. Pulmonary stenosis
D. Atrial septal defect

24%
49%
28%
1%

Frequency of Congenital Heart Defects

- VSD 30%
- PDA 9%
- Pulm stenosis 7%
- ASD 7%
- Coarctation 6%
- Aortic stenosis 5%
- Tetralogy 5%
- Transposition 5%
- Endocardial cushion defects 3%
- Hypoplastic Right 2%
- Hypoplastic Left 1%
- Total anomalous pulmonary veins 1%
- Truncus arteriosus 1%

Cyanotic Congenital Heart Defects

- Tetralogy of Fallot (most common cardiac cause of cyanosis in toddlers)
- Transposition of the Great Vessels (most common cardiac cause of cyanosis in neonate)
- Total Anomalous Pulmonary Venous Return
- Truncus Arteriosus
- Tricuspid Atresia
- Hypoplastic Left Heart Syndrome
- Pulmonary atresia
Heart Murmurs

• Most are transitional and benign (most common is Stills) -- musical
• Usually not associated with other signs or symptoms
• Pathologic murmurs
  – Grade III or louder
  – Harsh
  – Continuous
  – Diastolic
  – Other signs or symptoms

3. A newborn is noted to have marked adduction of the right forefoot with a convex lateral border. Ankle movement is normal. No other findings. Which of the following is true?

A. It will probably resolve without treatment in about a year
B. This is a rare condition
C. Surgical repair is usually performed if it does not resolve
D. This condition is usually bilateral

3% 73% 1% 13%

Pediatric Foot Problems

• Metatarsus adductus
  – Most common congenital foot deformity
  – Usually unilateral on the left and more common in girls
  – 85-90% resolve without treatment
  – If it does not resolve, use serial casting
• Other causes of in-toeing
  – Femoral antetorsion causes medial rotation at the hip
  – Tibial torsion
  – Adducted great toe
• Treatment is observation (refer at 3 years)

Developmental Dysplasia of the Hip

• Risk factors
  – Female
  – Breech
  – 1st degree relative
  – Possible association with foot deformities and IUGR
• Evaluate using Ortolani’s and Barlow’s maneuvers
  – “Clunk” is positive (not “click”)
• Orthopedic consult more reliable than ultrasound (not accurate for 6 weeks)
• Refer early or for persistent findings at 2 months
• Pavlik harness (hips in flexion and abduction)

USPSTF Recommendation

• The USPSTF concludes that evidence is insufficient to recommend routine screening for developmental dysplasia of the hip in infants as a means to prevent adverse outcomes.
  Rating: "I" statement.
• > 90% of those identified in the newborn resolve spontaneously
• Poor evidence of the effectiveness of surgical or non-surgical treatments
Beware

- Most foot and leg deformities are benign
- Most resolve over time
- Resolution may take many years
- Beware unilateral deformities and those associated with pain (get X-rays)
- Look for asymmetry in length, skin folds, and position.

4. You were planning to send home a well term infant, but his bilirubin returns at 11.0 mg/dL at 30 hours. Mother is breastfeeding. What should you do?

A. Reassure mother and send infant home
B. Send infant home, but return tomorrow for repeat bilirubin
C. Stop breastfeeding and switch to formula
D. Start phototherapy

Treatment of Hyperbilirubinemia

- Increase feeds (may continue to breastfeed), discourage supplemental dextrose or water
- Phototherapy (see bilitool.org)
  - Total bilirubin ≥ 12.7 for infant at 30 hours of age
  - Exchange transfusion
  - Total bilirubin ≥ 20-25 at < 48 hours and failure of phototherapy
  - Total bilirubin ≥ 25-30 at > 48 hours and failure of phototherapy

Hyperbilirubinemia

- Physiologic jaundice
  - Newborns conjugate bilirubin slower, have higher RBC turnover, and have decreased excretion
  - Peaks at 3-5 days
  - Usually 3-12 mg/dL (up to 17 mg/dL)

Breastfeeding Jaundice

- Early onset---2-5 days of age
- Transient---up to 10 days
- Exaggeration of physiologic jaundice
- Insufficient frequency of feeds
- Stools infrequent
Breast Milk Jaundice

• Later onset---5-10 days of age
• Persists > 1 month
• Prolongation of physiologic jaundice caused by a factor in human milk
• Frequent feeds
• Normal stooling
• Serum bili eventually returns to normal without stopping breastfeeding

Classification of Hyperbilirubinemia

• Increased Bilirubin Load: ↑ unconjugated bilirubin
  – Hemolytic causes: ↑ reticulocytes > 6%
    • Coombs + = Rh or ABO incompatibility (mother O, infant A or B)
    • Coombs - = Abnormal red cells or red cell defects, drugs, sepsis
  – Nonhemolytic causes: normal reticulocytes
    • Cephalohematoma, bruising, CNS hemorrhage
    • Polycythemia: fetal-maternal or twin-twin transfusion, delayed cord clamping
    • Exaggerated enterohepatic circulation: cystic fibrosis, pyloric stenosis, Hirschsprung’s disease, breast milk
• Decreased Bilirubin Conjugation: ↑ unconjugated
  – Crigler-Najjar, Gilbert syndrome, hypothyroidism, breast milk

Classification (cont.)

• Impaired Bilirubin Excretion: ↑ unconjugated and conjugated bilirubin levels, negative Coombs
  – Biliary obstruction: biliary atresia, Dubin-Johnson
  – Infection: sepsis, UTI, syphilis, TB, hepatitis, rubella, herpes, toxoplasmosis
  – Metabolic disorder: Wilson’s, Niemann-Pick, Gaucher’s, hypothyroidism, cystic fibrosis
  – Chromosomal abnormality: Turner’s, trisomy 18, 21
  – Drugs: sulfa, rifampin, erythromycin, tetracycline, corticosteroids

Failure to Stool

• 70% of infants pass meconium in first 12 hours of life
• After 24 hours consider secondary causes
  – Hirschsprung’s (colonic aganglionosis or functional obstruction of the rectum or colon)
  – Imperforate anus
  – Cystic fibrosis
• Necrotizing enterocolitis
  – Most common cause of acute intestinal obstruction and septic abdomen in neonates.
  – Ischemic insult + microorganisms + altered host resistance (reduced with prenatal steroids in premature infants)

Pyloric Stenosis

• Over first two weeks of life
  – Nonbilious and projectile vomiting
  – No other systemic symptoms
  – Infant appears hungry and feeds often
• Other causes of vomiting
  – Overfeeding
  – GERD small amounts of vomiting; weight gain
  – Midgut volvulus: bilious vomiting with “double-bubble” sign
  – Gastroenteritis: fever, diarrhea
  – CNS injury: other neurological signs

Chlamydia Trachomatis

• Most common sexually transmitted disease in U.S.
• Manifestations in newborn
  – Pneumonia
  – Conjunctivitis
• Treat with erythromycin (50 mg/kg/d qid for 14 days)
  – Possible association with infantile hypertrophic pyloric stenosis

© American Academy of Family Physicians. All Rights Reserved.
Infantile Colic

- Uncontrolled crying especially at night
- Frequent “spitting up”
- Appropriate weight gain
- Normal exam
- The 5 Ss
  - Swaddling
  - Side/stomach position
  - Shushing sounds
  - Swinging
  - Sucking

5. You delivered a 36-week-gestation female to a 16 y/o first-time mother with poor prenatal care. The infant is still not feeding well after nearly 48 hours. Weight loss is 10%, child is moderately jaundiced, temperature 37.8°C. What should you do?

A. Send the child home with the mother with careful precautions
B. Observe the child for the next 12-24 hours
C. Order a CBC
D. Do a complete septic work up

Signs of Sepsis in the Newborn

- Feeding problems
- Temperature instability
- Respiratory distress
- Vomiting/diarrhea
- Abdominal distension
- Jaundice
- Pallor
- Skin rash/petechiae

- Hypotension
- Tachycardia
- Apnea and bradycardia
- Irritability
- High-pitched cry
- Lethargy
- Weak suck
- Convulsions
- Bulging or full fontanelle

Torch Syndrome

- Agents
  - Toxoplasmosis (Treat: pyramethamine and sulfadiazine 21 days)
  - Other infections (i.e. syphilis)
  - Rubella (congenital – cataracts and patent ductus)
  - Cytomegalovirus (CMV—risk is greatest in 1st half of pregnancy)
  - Herpes simplex
- Common symptoms
  - Lymphadenopathy
  - Hepatosplenomegaly
  - Hemolytic anemia and thrombocytopenia with jaundice
  - Stillbirth and neonatal death
- Evaluation
  - CBC, blood, urine, CSF cultures (viral, fungal, bacterial)
  - CXR
  - CT head
  - Lumbar puncture

Herpes Simplex

- Manifestations: 1/3 each
  - Disseminated disease involving multiple organs, primarily liver and lungs
  - Localized CNS disease
  - Localized to skin, eyes and mouth, parenteral acyclovir (60mg/kg/d TID for 2-3 weeks)
- Clinical findings
  - Vesicular skin rash
  - Meningoencephalitis
  - Retinopathy

Picture courtesy of CDC/Dr. Miller

© American Academy of Family Physicians. All Rights Reserved.
### Hepatitis B

- **HBsAg+ mother**
  - HBIG given prior to 12 hours of age
  - Hepatitis B vaccine given prior to 12 hours of age
- **Mother's status unknown**
  - Hepatitis B vaccine given prior to 12 hours of age
  - Mother tested for Hepatitis B, and if positive HBIG given as soon as possible (prior to 1 week)

### 6. Six weeks after leaving the hospital, an African-American male is rushed into the office after mother found him “not breathing.” He aroused with stimulation. Child has not been ill, examination is normal. What should you tell the parents to help prevent another episode?

<table>
<thead>
<tr>
<th>Option</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Have the infant sleep with mother for the next few weeks</td>
<td>0%</td>
</tr>
<tr>
<td>B. Place baby in the prone position for sleep</td>
<td>17%</td>
</tr>
<tr>
<td>C. Avoid exposure of the infant to second-hand smoke</td>
<td>79%</td>
</tr>
<tr>
<td>D. Discourage the use of a pacifier</td>
<td>4%</td>
</tr>
</tbody>
</table>

- SIDS
  - Sudden infant death syndrome (SIDS) has a peak incidence at 2-3 months of age
  - African-Americans, Native and Alaskan Americans have rates 2-3 X the national average
  - Infants should be kept in close proximity in a separate bed
  - Infants should be placed on their backs to sleep
  - Exposure to cigarette smoke increases risk
  - Pacifier use may be beneficial
  - Fans may be helpful
  - Assess pulse at the brachial artery (alternatively at the femoral)

### Failure to Thrive

- Inadequate physical growth diagnosed by observation of growth over time using standard growth chart
- Weight falls below the 5th percentile or crosses two major percentile lines
- Growth charts at [www.cdc.gov](http://www.cdc.gov)
- Neglect is most common form of child abuse (60%)
- Most common cause of death: failure to provide for child’s basic needs

### Etiology

- **Inadequate caloric intake**
  - Inadequate or inappropriate feeding by parents
  - Poverty, neglect
  - Mechanical feeding problems
- **Inadequate absorption**
  - Celiac disease or milk allergy
  - Cystic fibrosis
  - Vitamin or mineral deficiencies
  - Biliary atresia or liver disease
- **Increased metabolism**
  - Hyperthyroidism
  - Chronic infection (HIV)
  - Hypoxemia
- **Defective utilization**
  - Genetic abnormalities (Down’s)
  - Metabolic disorder (storage diseases)
  - Congenital infections
- **Psychosocial**

© American Academy of Family Physicians. All Rights Reserved.
Treatment

• High-calorie diet (150% of recommended)
• Feeding behaviors
• Hospitalization
• Referral
• Parents may need treatment

7. What is the most common malignancy seen in children?

A. Brain tumor
B. Leukemia
C. Neuroblastoma
D. Retinoblastoma

Tumors in Young Children

• Wilms tumor:
  – Embryonal neoplasm of Kidney
  – Most common between ages 1 and 3
• Retinoblastoma:
  – Presents as white instead of red reflex on eye exam
  – Also presents with strabismus
  – Most common age 13-18 months
• Neuroblastoma:
  – 2nd most common solid tumor (after brain) in children.
  – ½ are found before the age of 2
  – Most have metastasized
• Rhabdomyosarcoma:
  – Most common soft-tissue sarcoma in children
  – Usually ages 2-5; head and neck most common area

Lacrimal Duct Obstruction

• Persistent tearing, usually unilateral
• Can try "milking" the duct
• Antibiotics or steroids are not indicated
• Usually resolves by 6 months
• Treat if not resolved in 1 year

References

Answers
1. A
2. A
3. A
4. B
5. D
6. C
7. B