Nursing Assessment and Care of the Newborn During Transition and Adaptation to Extrauterine Life

Adaptation to Extrauterine Life

• At term, the fetus is ready and mature enough for separate existence, behavior competencies, and social interaction
• TRANSITION - Infants undergo phases of instability during the first 6 to 8 hours of life.
• Critical period for assessment and observation

Transitional Periods

• First Period of Reactivity
  From birth to 30 minutes
  Alert and active; VS unstable; resp estab
• Sleep/Inactive Period
  Next 60-100 minutes
  Sleepy and/or decreased activity
• Second Period of Reactivity
  4-8 hours after birth
  Again alert & active; tachy, tone, mucous
Immediate Adaptations - Respiratory

1. First big breath/cry at birth - reflex
2. Signs of distress – nasal flaring, retractions, grunting
3. Surfactant – lowers surface tension to keep alveoli open with less pressure
4. On NB asmt – symmetry of expansion (rib cage does not expand as readily as an adult), clavicles/ribs; crackles normal first few hrs.

Cardiovascular

1. First breath initiates a series of CV changes from fetal to neonatal circulation
2. Rate 140bpm, less if asleep, more if crying. Count apical for one full minute. Range of 100-180 could be ok.
3. BP 60-80/40-50; check in both arms, if >10mmHg difference could be cardiac defect. Blood volume = 300ml

Thermoregulation

- Thermogenesis – heat production
- Newborn cannot shiver to produce heat, so must produce heat in its fat stores – brown fat – richer in vascular supply; intense lipid metabolism can warm infant by increasing heat production by 100%
- Hypothermia from excessive heat loss is common & DANGEROUS
Heat Loss Occurs...

- Convection: loss from body surface to cooler ambient air. TX: regulate ambient temp, plastic covers, avoid drafts

- Radiation – loss from body surface to cooler solid object NOT in contact with body. TX: keep away from windows; use double wall isolettes.
• Conduction – loss to cooler solid object IN contact with body. TX: warm all solid objects in contact with baby.
• Evaporation – loss through conversion of skin water to vapor. TX: dry immediately and keep dry. Bathe after temp stable; keep clothing/linen dry.

Temperature Regulation
• Heat retained primarily by: flexed position, peripheral vasoconstriction
• COLD STRESS
• Increases need for O₂; oxygen to produce heat takes priority over maintenance of brain cells/CV function. If cold, pH decreases & pO₂ decreases …acidosis with hypoxia; vasoconstriction decreases pulmonary circulation
• Cold stress – increases basal metabolic rate. Glycolysis produces excessive fatty acids which causes metabolic acidosis and jaundice

SO WHAT…
do I teach parents? How do I prevent cold stress?

Normal Temp – 37C, 99F. Use Axillary, one rectal to assess patency. Temp Probe!!

◆Heat Stress – sweat glands nonfunctional

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Hematopoietic

• Hemoglobin = 12-24g/dl, average 17
• Hematocrit = 44-64%, average 55
• WBC = 9,000-30,000 normal at birth
• Iron stores last approx 5 months
• Increased WBC first day after birth, then falls to 11,500 for neonatal period.
• Infection usually marked by decreased WBC
• Clotting factors decreased in first few days…

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Renal

• Limited ability to concentrate urine
• Normal number of voidings 6-10 per day
• Urine pale straw color, also normal is cloudy or pink-tinged
• Fluid balance – newborn normally loses 5-10% of birth weight; returns to normal within 10 days
Gastrointestinal
• Mouth – gums pink and moist; “sucking” pads
• Sucking, swallowing, breathing - depends on neuromuscular development
• Bowel sounds – present soon after birth
• Stomach – 30-90ml capacity
• Digestion – simple carbs, protein, limited fats
• Stools – meconium in first 12-24 hours; 3rd day has transitional stools, 4th day = milk stool

Abdomen
• Umbilical cord – 3 vessels; 1 vein largest vessel, 2 arteries smaller. Look whitish-gray
• Bowel sounds present 1-2 hours after birth
• Palpation – hepatospleenomegaly? Remember renal masses!

Hepatic
• Liver fills 40% of abdominal cavity
• Metabolizes CHO
• Iron storage
• Conjugation of bilirubin
  immaturity, high hematocrit, bruising, cold stress, hypoglycemia, respiratory distress, hemolysis
Physiologic Jaundice
Neonatal hyperbilirubinemia
➢ appears after 24 hr, disappears by day 7
➢ signs and symptoms:
  yellow sclera, mucous membranes,
  thorax, abdomen and extremities
➢ Kernicterus – 20mg/dl results in brain
damage (enough bil has left blood to
interfere with brain cell synthesis)

Immune System
• Passive immunity from Mom
• Neonate immune factors
  produces IgG early
  IgA, IgD, IgE – much later and not fully
developed until children
  IgM – produced at birth
Hepatitis B – HbIG – vaccine given within
12 hr of birth to protect from Hep B (Mom)

Integumentary
• Color appropriate for ethnicity; pink muc.m
• Vernix Caseosa – whitish substance
  covering skin at birth; cheesy, odorless
  protective from damage in utero
• Erythematous – red color several hours
• Skin of extremities – blotchy, mottled,
  acrocyanosis
• Lanugo – fine hair covers body early, thins
  at term. Shoulders, pinna, buttocks
• Creases on palm/soles – the more
  creases, the more mature; Simian crease
• Caput succedaneum – edema of scalp
due to pressure during labor/ molding
• Cephalohematoma – blood between skull
  and periosteum
• Desquamation – peeling skin
• Milia – small white, immature sebaceous
glands
• Mongolian spots – bluish-black pigmented
  area, across buttocks. Will fade.

• Nevi - birth marks
• Stork Bites – telangiectic nevi
• Strawberry Mark - Nevus Vasculosis
• Port Wine Stain – Nevus Flammeus
Erythema Toxicum
  Transient rash, lesions of various stages:
  Macule, papule, vesicle. Normal
Edema – hands, feet, general. Infants of
diabetic moms have more edema
Visible blood vessels – few @ term, abdo

Reproductive
• Breasts – swollen due to estrogen from
  Mom – both sexes. Whitish discharge.
The more mature = larger the breast buds
• Female – ext. genitalia enlarged, labia
  majora cover minora @ term. Pink
discharge ok; as estrogen eliminated,
goes away
• Male – estrogen influence, pigmentation.
  testes descend, > rugae = more mature.
  hypospadias – urethra on inferior side of
  penis
Skeletal

- Head - largest body part; approximately equal circumference as chest; 33-35cm.
- Molding – sutures overlap to decrease head size or shape to fit thru pelvis
- Microcephaly - <32cm. Disease? Genetic?
- Macrocephaly - >4cm of chest circ; hydrocephaly?

Fontanels

- Spaces between skull bones
- Anterior – diamond shaped junction of parietal bones with frontal bones
- Posterior – triangle shaped; junction of parietal bones with occipital bones
- Sutures – cartilaginous; become ossified after full brain development occurs
- Should not be bulging, full, or depressed

Spinal column – normally has a C-curve; should be able to “walk” fingers down the spinous processes of vertebrae with no bulging or missing bones. Pouching, dimpling, discolorations, open areas are abnormal
- Hips – inspect buttocks, number of skin folds should be equal bilaterally
- Ortolani’s maneuver – congenital hip dysplasia/ dislocation asmt. “CLICK”
Legs, fingers, toes

- Correct/equal length and number
- Syndactyly or polydactyly
- Simian creases – continuous line across palm of hand frequently associated with Down’s syndrome.

Eyes, nose, ears, mouth

- Eyes – placement; no tears or discharge
  Lens clear with red reflex, pupils equal and reactive; movement random; scotoma
- Nose – symmetrical, no drainage; patent nostrils. Nose breathers!
- Ears – symmetry; cartilage rebounds when bent. Hearing similar to adult; hearing screening in NB nursery
- Mouth – assess palate; elicit suck reflex

Neuromuscular/Reflexes

- Sucking/rooting
- Grasp
- Moro/startle
- Babinski
- Stepping/walking
- Tonic Neck

- SEE PAGE 703-706!!
Infant States/Cues

Parent-Infant attachment affects both parents & infants by promoting a loving relationship and improved infant development, healthy self-image and better relationships later in life.

Cue Sensitivity

- Documented as origin of parent-infant attachment
- Involves recognition of individualized infant body language and provision of an appropriate response

State

- "Level of Consciousness"
- Single most important element for understanding an infant’s response to the environment
- Imperative for an appropriate response to infant needs
Sleep States: (two)

- Quiet sleep
- Active sleep

Transitional State

- Drowsy – can go either way – speak to infant, pick up = wake up; pat, leave alone, rock = back to sleep
Awake States

- Quiet alert – most attentive
- Active alert – early hunger cues, getting tired
- Crying – needs a change, requires parents to interpret cues

BEHAVIORS

- Can see and hear at birth
- Habituation – tune out
- Identification of newborn’s behaviors gives the nurse tools to help parents establish interaction with infant

Nursing Implications:

- Assessment includes signs of attachment/bonding
- Parent education – prenatal and postpartal
- Watch for progression – cues/clues, behaviors, “Parenting”!
Remember Response to Environmental Stimuli

- CUES, CLUES, BEHAVIORS!!
- Attachment – Brazleton:
- Temperment
- Habituation
- Consolability
- Cuddliness
- Irritability
- Crying

Dubowitz/Ballard Scales

- Neuromuscular maturity (level of CNS maturity) is reflected in reflex development and sleep-wake cycles.
- Physical maturity (Ballard includes ratings for extreme prematurity).
- Accurate ± or – 2 weeks.
- SEE Wong. Infant is assessed in each parameter; scored like GPA.

Nursing Care

- Ineffective Airway Clearance
  - excessive mucous – suction with bulb syringe, position side-lying or prone.
  - DeLee suction to empty stomach @ del. or for short periods nasopharyngeally.
  - Auscullate
• Impaired Gas Exchange
  poor respiratory effort, blow-by oxygen; alert pediatrician/ NICU

• Ineffective Thermoregulation
  increased RR/cyanosis are usually cold stress; skin-to-skin contact, cover with pre-warmed blanket (head too!), dried thoroughly?, radiant heat panel 37 degrees, skin probe on abdomen!!!, check temp q hr. Watch out for toe counters!! AKA grandmothers…

• Risk for Infection
  Eyes – chlamydia, gonorrhea
  Ophthalmia Neonatorum – erythromycin to lower conjunctival sac within 2 hr birth
  Umbilical cord – treated with drying agent/antimicrobial at delivery (triple dye); cleanse with alcohol every diaper change to keep clean, aid drying. Assess vessels, clamped until dry; diaper below cord!
  Walmart – don’t go there!! Handwashing!

Erythromycin Ointment (Ilotycin)

• Antibiotic; bacteriostatic and bacteriocidal
• Prophylaxis against gonorrhea, chlamydia to prevent opthalmia neonatorum
• Eye prophylaxis is mandatory in all 50 states
• Dose: 1-2cm ribbon in lower conjunctival sac
• Administration: within 1 hour of birth
• S/E: chemical conjunctivitis
• Potential for hemorrhage
  Lack of Vitamin K for several days
  AquaMephyton IM – vastus lateralis; within 2 hr of birth
• Potential for Jaundice
  Jaundice not normal in 1st 24 hours.
  Assess skin by blanching; head to toe.
  Central jaundice (abdo) mean bilirubin too high
  Physiologic peaks at about 6mg/dl @72hrs

Vitamin K (phytonadione)

• Trade: AQUAmephyton
• Used to prevent hemorrhagic disease of the newborn
• Provides Vitamin K to promote hepatic formation of clotting factors – vitamin K usually comes from intestinal flora, which the newborn doesn’t have

Vit. K, cont…

• Dose: 0.5mg – 1mg IM
• Administration: give within 1-2 hours of birth; wear gloves
• 25 ga, 5/8” needle
• Vastus lateralis
• 90 degree angle
• S/E: pain @ site; rub to lessen, erythema
• Potential for hypoglycemia
  Newborn abruptly loses glucose supply when cord cut. S/S = cyanosis, apnea, jittery, lethargy, high-pitched cry, twitching, seizures, eye rolling, sweating
  If infant of diabetic mom, LGA, >4000gm, received D5W in labor – check FSBS within 30 min of birth
  35-40mg/dl is lowest normal; feed D5W or gavage feed, IV

• PKU – inborn error of metabolism; genetic disorder where missing enzyme causes a buildup of phenylalanine, which causes retardation.
  States regulate screening test for all newborns –
  Phenylalanine levels increase after food is introduced and missing enzyme prevents metabolism.
  Assess (heel stick) level after 24 hr on milk

Universal Hearing Screening
• Hearing loss is the most common birth defect in the United States.
• One in 1,000 newborns is profoundly deaf; 2-3 in 1,000 have partial hearing loss.
• Main types are sensorineural and conductive, or a combination of the two.
• Sensorineural – loss of function within the inner ear or in the connection to the brain
• Conductive – sound waves aren’t properly transmitted to the inner ear because of a problem with the outer or middle ear.
UNHS

- OAE (otoacoustic emissions) – sound is emitted into the newborn’s ear by probe and any outer hair cell dysfunction or middle ear effusion is recorded
- ABR (auditory brainstem response) – sound is emitted into the ear with occlusive ear cups, but the test is sensitive to the activity of the cochlea, auditory nerve, and auditory brainstem pathways.

Discharge Planning

- New Parents License:
  - Circumcision care – vaseline gauze, watch bleeding, s/s infection; keep clean
  - Temperature taking – thermometer, axillary, how to read. Dress for environment.

New Parent License…

- Rashes – newborn or diaper?
- Cord Care – alcohol; diaper below
- Bathing - sponge bathe until cord falls off at 10-14 days. Avoid cold stress. Tub bath better after cord to prevent heat loss. How hot?
- Infant Cues and Clues – what to do for crying?
- Car Seat Safety – federally approved, rear facing, back seat installation until at least 1 year. No air bags in area of seat. Know laws/safety! Must have seat to go home!