

PCOM Board Review: Pediatrics

Jonathan Wilson, MD
January 28, 2017



Overview

- ◆ Newborn
- ◆ Growth and Development
- ◆ Infectious Disease
- ◆ Musculoskeletal

Newborn

- ◆ Neonate/Newborn: First month of life
- ◆ Infant: First year of life
- ◆ APGAR's
 - Appearance
 - Pulse
 - Grimace
 - Activity
 - Respirations

Newborn

Sign	0	1	2
HR	Absent	<100	≥ 100
Respiratory effort	Absent	Slow/irregular	Good/crying
Muscle tone	Limp	Some extremity flexion	Active motion
Response to bulb in nostril	No response	Grimace	Cough/Sneeze
Color	Blue/pale	Pink body/Blue extremities	Completely pink

Newborn

- ◆ Neonatal resuscitation: Review BLS, NRP, ACLS, etc.
- ◆ Nutrition
 - ◆ Breast milk (and most formulas) 20 calories/ounce (1oz = 30mL)
 - ◆ Energy requirement = Fluid requirement
 - ◆ 0-10kg 100 kcal/kg 100 mL/kg
 - ◆ 11-20 50 kcal/kg 50 mL/kg
 - ◆ ≥ 20 kg 20 kcal/kg 20 mL/kg

Newborn

- ◆ Can lose up to 10% of birth weight the first few days
- ◆ Should be back to birth weight by two weeks of life
- ◆ ≥ 6 wet diapers/day; 1-3 stools/day
- ◆ Vitamin D: 400 IU/day – should be sent home from nursery on Vitamin D (MVI)



© 2009 Logical Images, Inc.





Newborn

- ◆ Erythema Toxicum Neonatorum: 50% full term infants, begin at 24-48 hours (can begin up to 10 days out). Fades within one week.
- ◆ Salmon Patch “Stork Bite” “Angel’s Kiss” >50% newborns, due to capillary malformations. Fade within first year.
- ◆ Capillary Hemangioma: Rapid growth first 6 months, plateau period, then slow involution: 25% disappear by age 3, 50% by age 4, 75% by age 6.



© 2009 Logical Images, Inc.



Newborn

- ◆ Milia: May persist or may resolve over months to years
- ◆ Sebaceous Hyperplasia: Normal physiologic response to maternal androgens, resolve in 4-6 months.

Newborn

- ◆ Cardiology
 - ◆ VSD 25%, PDA 10%, most others 1-5%
- ◆ VSD: Loud holosystolic murmur, LLSB. May not hear in nursery due to higher right sided pressures first few days of life.
- ◆ PDA: Continuous machine-like murmur.
- ◆ Both represent left-to-right shunts and are often present with other cardiac anomalies.

Newborn

- ◆ Neonatal Jaundice in Term Infants
- ◆ Physiologic Jaundice
 - ◆ $<5\text{mg/dL}/24\text{ hours}$
 - ◆ On 2nd or 3rd day of life
 - ◆ Peak 2nd to 4th day
 - ◆ Resolve 5th to 7th day
 - ◆ Never reaches 12mg/dL

Newborn

- ◆ + Coombs: Rh, ABO, or minor antigen incompatibility
- ◆ - Coombs:
 - ◆ Breast feeding jaundice: due to decreased enterohepatic circulation
 - ◆ Breast milk jaundice: Late onset jaundice due to antibodies
 - ◆ Hemorrhage (cephalohematoma)
 - ◆ G6PD deficiency, Hereditary spherocytosis, etc.

Newborn

- ◆ Direct hyperbilirubinemia – rare – think biliary atresia or some other cause of obstruction.
- ◆ Treatment:
 - ◆ Fix underlying cause (supplement breast feeding if needed)
 - ◆ Phototherapy (converts indirect bilirubin into water soluble form). Decision to use based on plotting newborn on chart for age, TSB, and risk factors.

Newborn

- ◆ Conjunctivitis:
 - ◆ If chlamydia, occurs between 8 and 14 days with a watery discharge. Need to treat with ORAL erythromycin.
- ◆ Esotropia: If intermittent, likely to resolve by 6 months of age, so no need to refer to ophthalmology until then.

Newborn

- ◆ Lacrimal Duct Obstruction: Excessive tearing, usually unilateral. Likely to resolve by 12 months, so no need to refer to ophthalmology until then.
- ◆ Pyloric Stenosis: Non-bilious “projectile” vomiting at around 3 weeks of life. “Olive-like” mass palpated

Growth and Development

Age	Expressive Response	% intelligible speech to stranger
12 months	1 word	
2 years	2 word phrases (“want cookie”)	50%
3 years	3-4 word sentences. Uses pronouns and plurals (“I want a cookie.”)	75%
4 years	Tells a story	100%

Red Flags Suggesting Need for Immediate Speech-Language Evaluation

Age	Receptive	Expressive
12 months	—	Does not babble, point, or gesture
15 months	Does not look at or point to 5 to 10 objects or persons when named by parents	Does not use at least three words
18 months	Does not follow one-step directions	Does not say “mama,” “dada,” or other names
2 years	Does not point to pictures or body parts when named	Does not use at least 25 words
2.5 years	Does not verbally respond or nod/shake head to questions	Does not use unique two-word phrases, including noun-verb combinations
3 years	Does not understand prepositions or action words Does not follow two-step directions	Does not use at least 200 words Does not ask for things by name Repeats phrases in response to questions (echolalia)
At any age	—	Has regressed or lost previously acquired speech/language milestones

Growth and Development

- ◆ Birth weight
 - ◆ Doubles by 4 months
 - ◆ Triples by 12 months

Growth and Development

- ◆ Constitutional Growth Delay
 - ◆ Most common cause of short stature in children
 - ◆ Growth delay between 3 months and 3 years
 - ◆ Delay in puberty so remain behind on growth curves until later in adolescence
 - ◆ Growth and development are appropriate for skeletal age, but not biologic age
- ◆ Familial Short Stature
 - ◆ Follows growth curves
 - ◆ Look at the parents!

Infectious Disease

- ◆ Fever: 100.4 Fahrenheit/38 Celsius. Appropriate biologic response to infection. Not caused by teething.
- ◆ Febrile Seizures:
 - ◆ Generalized, tonic-clonic, short duration, no associated neurologic/metabolic abnormalities.
 - ◆ 2-5% children ages 6 months to 5 years (peak 18 months)
 - ◆ Risk of recurrence 14-70% depending on risk factors (<18 months, fever less than 1 hour prior to seizure, temp < 104, first degree relative with febrile seizure)
 - ◆ 2% lifetime risk of epilepsy

Infectious Disease

- ◆ Sepsis
- ◆ <28 days with fever:
 - ◆ Admit to hospital, LP, Blood cultures, Urine culture, IV antibiotics
- ◆ 28-90 days with fever:
 - ◆ If non-toxic appearing with normal WBC's and normal UA, blood and urine cultures, close follow-up, +/- LP & Ceftriaxone
 - ◆ Otherwise, admit to hospital, LP, Blood cultures, Urine culture, IV antibiotics

Infectious Disease

Infection	Bugs	Antibiotics
Meningitis <1 month	LEG Listeria, Enterics (especially E.coli), GBS	Ampicillin + Cefotaxime OR Ampicillin + Gentamicin
Meningitis 1-3 months	NEHSG Neisseria meningitides, Enterics, H. flu, Strep pneumo, GBS	Ampicillin + Cefotaxime OR Ceftriaxone
Meningitis >3 months	minus Enterics and GBS	Cefotaxime or Ceftriaxone + Vancomycin

Infectious Disease

◆ UTI

- ◆ VCUG's no longer recommended for febrile UTI's in children 2-24 months unless abnormal renal ultrasound
- ◆ Still get renal sonogram for girls with febrile UTI's 2-24 months and boys of any age
- ◆ PEES: Proteus, E. coli, Enterococcus, S. saprophyticus
- ◆ PO: Cephalosporins, TMP/SMX
- ◆ IV: Cephalosporins, Ampicillin + Gentamicin

Infectious Disease

- ◆ Acute Otitis Media:

- ◆ Acute onset, Middle Ear Effusion (MEE), Signs/Symptoms of Middle Ear Inflammation
- ◆ MEE: Bulging, decreased mobility, or AFL behind TM.
- ◆ Inflammation: Erythema of TM on exam, or Distinct otalgia
- ◆ Bacterial 75% of time: *S. pneumo* (40%), *H. flu* (30%), *Morexella catarrhalis* (15%)

Infectious Disease

Age	Toxic appearing, persistent otalgia for > 48 hours, temp ≥ 102.2 , or uncertain access to follow-up	Non-toxic, otalgia not persistent, temp < 102.2, and certain access to follow-up
< 6 months	Antibiotics	Antibiotics
≥ 6 months	Antibiotics	Observe for 48-72 hours

Infectious Disease

◆ Acute Otitis Media:

- ◆ Amoxicillin 80-90mg/kg per day (high dose to overcome resistant *S. pneumo*) divided twice daily
- ◆ Amoxicillin-clavulanate if accompanying conjunctivitis (think *H. flu*) or if failure with Amoxicillin
- ◆ Non-type 1 PCN Allergy – cephalosporins, if Type-1 PCN allergy, macrolides or Clindamycin
- ◆ Analgesics (oral and/or ear drops)

Infectious Disease

- ◆ Otitis Media with Effusion (OME)
 - ◆ MEE without inflammation or severe illness
 - ◆ Treatment is observation for up to three months, then tympanostomy tubes if not resolved
- ◆ Pneumonia
 - ◆ *S. pneumo* and Viral so high dose amoxicillin sufficient until preschool age
 - ◆ Add macrolides for atypical coverage at age 4

Infectious Disease

- ◆ Bronchiolitis:
 - ◆ Wheezing in infant during winter months
 - ◆ Most commonly caused by RSV
 - ◆ Bronchodilators are now contraindicated; support with Oxygen, hydration, nasal suctioning if obstruction.

Infectious Disease

- ◆ Pertussis: “Whooping Cough”
 - ◆ Catarrhal stage (common cold symptoms)
 - ◆ Paroxysmal stage (paroxysmal cough)
 - ◆ Convalescent stage (waning of cough over weeks to months)
 - ◆ Treat with macrolides, most effective if given during catarrhal stage but should be given at any phase to prevent spread.
 - ◆ Immunize, immunize, immunize!

Infectious Disease

- ◆ Fifth Disease “Erythema Infectiosum”
 - ◆ Human Parvovirus
 - ◆ Slapped-cheek appearance
 - ◆ Lace-like rash on trunk, moving to arms, thighs, and buttocks
 - ◆ Rash preceded by brief and mild illness (fever, malaise, myalgias, headache) by 7 days
 - ◆ Can cause fetal hydrops, IUGR, and fetal death

Infectious Disease

- ◆ Hand, foot, and mouth disease
 - ◆ Coxsackie Virus
 - ◆ Late summer/fall
 - ◆ 90% have oral lesions (palatal erythema and ulcers)
 - ◆ 2/3 have shallow yellow ulcers surrounded by halos on hands and feet

Infectious Disease

- ◆ Kawasaki's Disease
- ◆ “FEEL My Conjunctivitis”
 - ◆ Fever
 - ◆ Erythematous Rash
 - ◆ Extremity involvement
 - ◆ Lymphadenopathy
 - ◆ Mucus membrane involvement
 - ◆ Bilateral conjunctivitis
- ◆ Coronary artery aneurysms
- ◆ Treat with high dose aspirin and IVIG

Infectious Disease

- ◆ Antibiotic contraindications
 - ◆ Ceftriaxone in neonates (up to 28 days)
 - ◆ Displaces bound bilirubin and thus can cause hyperbilirubinemia
 - ◆ Tetracyclines under age 8
 - ◆ Tooth discoloration
 - ◆ Fluoroquinolones in children and adolescents
 - ◆ Cartilage/Joint damage
 - ◆ Erythromycin under 1 month
 - ◆ Pyloric stenosis

Musculoskeletal

- ◆ Transient Synovitis, Septic Hip, and Osteomyelitis
 - ◆ Assuming normal radiographs, if afebrile and normal CBC/ESR/CRP then likely Transient Synovitis (observe/NSAID's)
 - ◆ If any of the above are present, obtain hip ultrasound and aspirate if effusion or, if no effusion, check MRI to rule out osteomyelitis

Musculoskeletal

- ◆ Nursemaid elbow
 - ◆ Traction injury of 2-3 year olds
 - ◆ Can treat with hyperpronation or supination/flexion

Musculoskeletal

- ◆ Slipped Capital Femoral Epiphysis (SCFE)
 - ◆ 12 year old overweight limping male with knee pain
 - ◆ Ice cream falling off of cone on hip x-ray
 - ◆ Treat with surgery
- ◆ Apophysitis
 - ◆ Osgood Schlatter – Tibial tuberosity
 - ◆ Sever's Disease – Insertion of Achilles tendon into calcaneous
 - ◆ Treat with rest, ice, and NSAID's

Questions

- ◆ During rounds, you notice a new rash on a full-term 2-day old white female. It consists of 1-mm pustules surrounded by a flat area of erythema, and is located on the face, trunk, and upper arms. An examination is otherwise normal, and she does not appear ill. Which one is the most likely diagnosis?
 - A. Erythema toxicum neonatorum
 - B. Transient neonatal pustular melanosis
 - C. Acne neonatorum
 - D. Systemic herpes simplex
 - E. S. aureus species

Questions

- ◆ During rounds, you notice a new rash on a full-term 2-day old white female. It consists of 1-mm pustules surrounded by a flat area of erythema, and is located on the face, trunk, and upper arms. An examination is otherwise normal, and she does not appear ill. Which one is the most likely diagnosis?
 - A. **Erythema toxicum neonatorum**
 - B. Transient neonatal pustular melanosis
 - C. Acne neonatorum
 - D. Systemic herpes simplex
 - E. S. aureus species

Questions

- ◆ A 12 year old male is brought to your office by his parents because he has been limping for the past month. He says he has pain in the groin and knee, but the pain is poorly localized. On examination he is noted to be obese, with normal findings on examination of the knee. There is some decrease in internal rotation of the hip on the involved side. His gait is antalgic. The most likely cause of this problem is
 - A. Unreported trauma
 - B. Aseptic necrosis of the femoral head
 - C. Reactive arthritis
 - D. Juvenile rheumatoid arthritis
 - E. Slipped capital femoral epiphysis

Questions

- ◆ A 12 year old male is brought to your office by his parents because he has been limping for the past month. He says he has pain in the groin and knee, but the pain is poorly localized. On examination he is noted to be obese, with normal findings on examination of the knee. There is some decrease in internal rotation of the hip on the involved side. His gait is antalgic. The most likely cause of this problem is
 - A. Unreported trauma
 - B. Aspheric necrosis of the femoral head
 - C. Reactive arthritis
 - D. Juvenile rheumatoid arthritis
 - E. Slipped capital femoral epiphysis**

Questions

- ◆ Which one of the following is an appropriate rationale for antibiotic treatment of *Bordatella pertussis* infections?
 - A. It delays progression from the catarrhal stage to the paroxysmal stage
 - B. It reduces the severity of the symptoms
 - C. It reduces the duration of the illness
 - D. It reduces the risk of transmission to others
 - E. It reduces the need for hospitalization

Questions

- ◆ Which one of the following is an appropriate rationale for antibiotic treatment of *Bordatella pertussis* infections?
 - A. It delays progression from the catarrhal stage to the paroxysmal stage
 - B. It reduces the severity of the symptoms
 - C. It reduces the duration of the illness
 - D. It reduces the risk of transmission to others**
 - E. It reduces the need for hospitalization

Questions

- ◆ Four weeks after successful initial treatment of unilateral otitis media in a 2-year-old male enrolled in day care, you reevaluate the child. He is asymptomatic, but you detect a middle ear effusion in the affected ear. The tympanic membrane is otherwise normal. The best management at this time would be
 - A. Inflation of the eustachian tube by the Valsalva maneuver
 - B. An antihistamine for 30 days
 - C. Low-dose corticosteroids for 30 days
 - D. Referral to an ENT specialist
 - E. No further treatment, with reevaluation in 2 months

Questions

- ◆ Four weeks after successful initial treatment of unilateral otitis media in a 2-year-old male enrolled in day care, you reevaluate the child. He is asymptomatic, but you detect a middle ear effusion in the affected ear. The tympanic membrane is otherwise normal. The best management at this time would be
 - A. Inflation of the eustachian tube by the Valsalva maneuver
 - B. An antihistamine for 30 days
 - C. Low-dose corticosteroids for 30 days
 - D. Referral to an ENT specialist
 - E. **No further treatment, with reevaluation in 2 months**

Questions

- ◆ A full term infant weighing 6lb 8oz at birth will typically weight 20lb at what age?
- A. 6 months
- B. 9 months
- C. 12 months
- D. 15 months
- E. 18 months

Questions

- ◆ A full term infant weighing 6lb 8oz at birth will typically weight 20lb at what age?
- A. 6 months
- B. 9 months
- C. 12 months**
- D. 15 months
- E. 18 months

Questions

- ◆ Which one of the following jaundiced infants can be treated expectantly without a full workup for pathologic causes?
 - A. A 12-hour-old term infant with a total bilirubin of 10 mg/dL
 - B. A 1-day-old term infant with a total bilirubin of 20 mg/dL
 - C. A 2-day-old term infant with a total bilirubin of 10 mg/dL
 - D. A 1-week-old term infant with a total bilirubin of 25 mg/dL

Questions

- ◆ Which one of the following jaundiced infants can be treated expectantly without a full workup for pathologic causes?
 - A. A 12-hour-old term infant with a total bilirubin of 10 mg/dL
 - B. A 1-day-old term infant with a total bilirubin of 20 mg/dL
 - C. A 2-day-old term infant with a total bilirubin of 10 mg/dL**
 - D. A 1-week-old term infant with a total bilirubin of 25 mg/dL

References

- ◆ Kliegman RM, Behrman RE, Jenson HB, Stanton BF. Nelson Textbook of Pediatrics. 18th ed. Philadelphia, PA: Saunders Elsevier; 2007
- ◆ Zitelli BJ, Davis HW. Atlas of Pediatric Physical Diagnosis. 4th ed. Philadelphia, PA: Mosby; 2002
- ◆ American Academy of Pediatrics. In: Pickering LK, Baker CJ, Long SS, McMillan JA, eds. Red Book: 2006 Report of the Committee on Infectious Diseases. 27th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2006
- ◆ Subcommittee on Urinary Tract Infection, Steering Committee on Quality Improvement and Management. Urinary Tract Infection: Clinical Practice Guidelines for the Diagnosis and Management of the Initial UTI in Febrile Infants and Children 2 to 24 Months. Pediatrics 2011; 128;595

References

- ◆ *McLaughlin, MR. Speech and Language Delay in Children. Am Fam Physician. 2011 May 15;83(10):1183-1188*
- ◆ *Raghuveer TS, Cox AJ. Neonatal Resuscitation: An Update. Am Fam Physician. 2011 Apr 15;83(8):911-918.*
- ◆ *Graves RC, Oehler K, Tingle LE. Febrile Seizures: Risks, Evaluation, and Prognosis. Am Fam Physician 2012 Jan 15;85(20):149-153.*
- ◆ *Kalyanakrishnan R, Sparks RA, Berryhill, WE. Diagnosis and Treatment of Otitis Media. Am Fam Physician. 2007 Dec 1;76(11):1650-1658.*
- ◆ *American Academy of Pediatrics. The Diagnosis and Management of Acute Otitis Media Pediatrics. 2013 Mar 1 vol 131 e964-e999.*