PEDIATRICS

CHAPTER 29

1. **What is the first task you must complete when assessing a newborn immediately after delivery?**
   Stimulate respirations. Suction the **m**outh then **n**ose (i.e., in alphabetical order) if secretions appear to be impairing respiration.

2. **When should positive pressure ventilation (PPV) be initiated?**
   Begin PPV if the neonate's heart rate drops below 100 beats/minute or if the neonate is experiencing respiratory difficulty (e.g., gasping, irregular breathing pattern).

3. **How many blood vessels does a normal umbilical cord have? What disorder should be suspected if one of the vessels is absent?**
   The umbilical cord is checked at birth for the presence of **three** blood vessels: two arteries and one vein. If only one artery is present, investigate with ultrasound for congenital renal malformations (e.g., renal agenesis).

4. **When should you initiate cardiopulmonary resuscitation (CPR) on a newborn? What is the appropriate compression-to-ventilation ratio?**
   CPR should be initiated if the newborn's heart rate drops below 60 beats/minute. Perform CPR at a ratio of 3:1 chest compressions to ventilations.

5. **How can transient tachypnea of the newborn (TTN) be distinguished from respiratory distress syndrome (RDS)?**
   Look at the gestational age when delivery occurred and look at the infant's chest x-ray. When TTN occurs, it is often in term or near-term infants delivered by cesarean section. When RDS occurs, it will be in a premature infant due to insufficient surfactant production. The chest x-ray of TTN will show *hyper*expanded lungs, possibly with pulmonary edema (caused by fluid retention); the chest x-ray of RDS will show *hypo*expanded lungs that may be described as having a "ground-glass" appearance (due to atelectasis and decreased alveolar recruitment).

6. **How does the management of TTN differ from managing RDS?**
   TTN management is more conservative, typically resolving after simple oxygen administration and occasionally requiring PPV. RDS, on the other hand, may require intubation with positive end-expiratory pressure (PEEP). Giving antenatal steroids to the mother may help reduce the severity of RDS if premature delivery is anticipated.

7. **What are the potential sequelae of extended oxygen delivery by PEEP in a premature neonate?**
   Retinopathy of prematurity (caused by neovascularization and treated by laser ablation), intraventricular hemorrhage, and bronchopulmonary dysplasia are the three main sequelae to watch for that may be caused by excessive PEEP.

8. **What is an Apgar score? At which time points should an Apgar score be measured? Explain the scoring criteria for each Apgar category.**
   The Apgar score is a general measure of newborn well-being, with five categories worth 2 points each for a total of 10 possible points. A score of 8 or above is considered acceptable. An Apgar score should be assessed at minutes 1 and 5 postpartum. Additional Apgar scores should be recorded every 5 minutes only if a score of 8 or higher has not been achieved. Use **APGAR** as a mnemonic to remember the five categories: **a**ppearance (skin color), **p**ulse (heart rate), **g**rimace (reflex irritability), **a**ctivity (muscle tone), and **r**espiratory effort (breathing).

	Number of Points Given		
Category	***0***	***1***	***2***
Appearance (color)	Completely cyanotic	Acrocyanosis: body pink, extremities blue	Completely pink
Pulse (heart rate)	Absent	<100 beats/min	>100 beats/min
Grimace (reflex irritability)[a]	None	Excessive stimulation required	Grimace and strong cry, cough, and sneeze

	Number of Points Given		
Category	***0***	***1***	***2***
Activity (muscle tone)	Flaccid limbs	Limbs are flexed but do *not resist* active extension	Active motion or able to partially resist active extension
Respiratory effort	Apneic	Irregular respirations or a slow, weak cry	Good, strong cry

[a]Reflex irritability usually is measured by the infant's response to stimulation of the sole of the foot or a catheter put into the nose.

9. True or False: The Apgar score may be used to predict long-term outcomes.
False. The Apgar score tells you what is happening *right now* but does not predict long-term outcomes.

10. Which two shots should all newborns receive?
All newborns should receive intramuscular vitamin K and the hepatitis B vaccine within 24 hours following delivery. If the mother is positive for the hepatitis B surface antigen (HBsAg), also give HBV immunoglobulin to the newborn. If the mother's HBV status is unknown, draw a serum HBsAg level to decide if the newborn needs immunoglobulin or if just giving the vaccine will be sufficient.

11. Why is a vitamin K injection given to the neonate immediately following delivery?
The neonate's gut flora is not yet mature enough to produce its own vitamin K. Giving an intramuscular injection of vitamin K is prophylactic against hemorrhagic disease of the newborn.

12. What are the commonly performed screening tests for metabolic and congenital disorders?
States vary widely in their policies regarding newborn screening, but there are a few nearly universal screens to know. All states screen for hypothyroidism and phenylketonuria at birth; these screens must be done within the first month of life. Most states also screen for galactosemia, cystic fibrosis, and hemoglobinopathies such as sickle cell disease. Less common screening tests that may still appear on the USMLE include homocystinuria, maple syrup urine disease, congenital adrenal hyperplasia, cystic fibrosis, biotinidase deficiency, tyrosinemia, and toxoplasmosis. Remember that screening tests are highly sensitive, so if any of these screens come back positive, your next step should be to order a confirmatory test with high specificity to rule out a false-positive result.

13. Compare and contrast gastroschisis vs. omphalocele. How do they present clinically? Which is enclosed in a membrane? What is the appropriate management for each condition?
Gastroschisis and omphalocele are two types of bowel extrusion that may be present at birth. Gast**r**oschisis is typically extruding to the **r**ight of the umbilicus and is *not* covered in membrane. O**m**phalocele typically extrudes directly through the umbilicus (i.e., **m**idline) and *is* covered by a **m**embrane. Both are managed the same way: wrapped in a saline-soaked sterile dressing and covered (also called siloed) to prevent infection or desiccation as the intestines slowly return where they belong. A nasogastric tube may be considered to decompress the bowel.

14. How is imperforate anus diagnosed?
Imperforate anus is diagnosed with an upside-down x-ray, to allow colonic gas to rise and show exactly how far the imperforate lesion is from the anus.

15. Once imperforate anus has been diagnosed, which studies do you order next? Explain why?
Imperforate anus is associated with the VACTERL anomalies. **VACTERL** is an acronym for **v**ertebral anomalies, imperforate **a**nus, **c**ardiac malformations, **t**racheal-**e**sophageal malformation, **r**enal dysfunction, and **l**imb malformation (especially the thumbs). Order a spinal x-ray, fetal echocardiogram, and renal ultrasound, and attempt to pass a nasogastric tube to work up each potential VACTERL complication before diving straight into management for imperforate anus.

16. How does the management of imperforate anus differ if the lesion is distal (e.g., closer to the anus) vs proximal (e.g., further from the anus)?
After additional VACTERL complications have been ruled out, distal lesions can be corrected as soon as they are identified: either by dilation or minor surgery. Proximal lesions require further neonatal development before they can be corrected, so your management *right now* should be to place a colostomy and defer surgical correction for the future (but before the infant begins to toilet train).

17. A neonatal abdominal x-ray shows a double-bubble sign. What is on your differential? What clinical or imaging clues can be used to distinguish between these possibilities?
A neonatal abdominal x-ray with a double-bubble sign is not as narrow of a differential diagnosis as you may think. The most testable diagnoses include malrotation, intestinal atresia, duodenal atresia, and annular pancreas.

These can be distinguished by looking at what is going on with the air-fluid levels: A double-bubble sign with normal air-fluid levels suggests malrotation, a double-bubble sign with multiple air-fluid levels suggests intestinal atresia, and a double-bubble sign with no distal air-fluid levels indicates either duodenal atresia or annular pancreas. In clinical practice it is difficult to tell duodenal atresia and annular pancreas with from imaging alone, but on the USMLE, look for mentions of **D**own syndrome to indicate **d**uodenal atresia as the most likely etiology rather than annular pancreas.

18. How does Hirschsprung disease present? What is its pathophysiology?

Hirschsprung disease presents as constipation in a newborn with explosive diarrhea on digital rectal exam (squirt sign). Less severe conditions may not present until the child is 2 to 3 years old. Hirschsprung disease is caused by a lack of neural crest cell migration, resulting in no Meissner plexus or Auerbach plexus in the rectum. Because of this, the sphincter cannot relax, resulting in fecal retention. Hirschsprung disease is associated with trisomy 21 (Down syndrome).

19. How is Hirschsprung disease worked up, diagnosed, and managed?

If suspected, Hirschsprung disease is worked up with anorectal manometry (which would show increased rectal tone). Diagnosis is made by suction biopsy, taking care to include the **submucosa** (i.e., where the absent neurons *should* be found). Hirschsprung disease is managed with surgical resection of the affected colon.

20. What clinical presentation and physical exam findings would make you suspect pyloric stenosis in an infant? How is it managed once diagnosed?

Pyloric stenosis is characterized by nonbilious projectile vomiting with possibly visible peristaltic waves or a palpable olive-shaped mass in the infant's abdominal right upper quadrant. Surgically correct with pyloromyotomy; be sure to give intravenous fluids and electrolytes to reduce the risk of postoperative apnea.

21. What three characteristic acid-base and electrolyte abnormalities are typically present in infants with pyloric stenosis? Explain why these occur.

Expect to see hypochloremic hypokalemic metabolic alkalosis in these infants. Pyloric stenosis causes projectile vomiting of gastric acid, meaning your patient is actively losing H^+, Cl^-, and fluid. The body acts to prevent fluid-related dehydration by releasing aldosterone, which exchanges K^+ for Na^+ to facilitate water retention. The ultimate result of this physiologic cascade is hypochloremic hypokalemic metabolic alkalosis.

22. What is the leading diagnosis for a prematurely born infant now presenting with bloody stool? What is your next step?

A premature infant with bloody stool will almost always have necrotizing enterocolitis (NEC). If you see pneumatosis intestinalis (air in the bowel wall), you have confirmed NEC. This patient needs to become NPO (*nil per os*, "nothing by mouth") immediately, with feeding provided by total parenteral nutrition and intravenous fluids. Decompress the bowel with a nasogastric tube and start broad-spectrum antibiotics to prevent shock. Surgery is only necessary if clinical deterioration or perforation occurs; perforation will present as air under the diaphragm on imaging studies.

23. How is infant colic defined and treated?

Infant colic is described as crying/fussing for no apparent reason lasting 3 or more hours per day for at least 3 days per week in a healthy infant younger than 3 months. Parents should be educated regarding feeding and soothing techniques and reassured that the condition is self-limited.

24. How is neonatal hypoglycemia diagnosed and managed?

Serum glucose levels below 40 mg/dL are considered diagnostic for neonatal hypoglycemia. There are four management options for neonatal hypoglycemia, depending on the level of severity. Asymptomatic hypoglycemia is managed with simple oral feeding. Symptomatic hypoglycemia (e.g., lethargic, tremulous, excessively irritable infants) should be managed with a bolus of dextrose (typically D10W): 2 L per kg body weight. If that bolus does not resolve the hypoglycemia, refractory hypoglycemia should be treated with a dextrose infusion. In the most severe cases, where serum glucose is either unmeasurable or the infant appears obtunded, administer intramuscular glucagon.

25. How can conjunctivitis caused by *Neisseria gonorrhoeae* be distinguished from conjunctivitis caused by *Chlamydia trachomatis*? How is each conjunctival infection treated?

Conjunctivitis caused by *Neisseria gonorrhoeae* will occur during the first week of life (day 2–7), while conjunctivitis caused by *Chlamydia trachomatis* will occur during the second week of life (day 5–14). Either conjunctival infection may present bilaterally, but if the infection is unilateral only, it is *C. trachomatis*. Treat gonorrheal conjunctivitis with topical erythromycin drops; treat chlamydial conjunctivitis with oral erythromycin.

26. Which infants should receive iron supplementation? At what age?

Iron supplements are recommended for exclusively breastfed infants beginning at 4 months of age. Infants receive enough iron during the third trimester of pregnancy to last for the first 4 months of life, but because breast milk contains so little iron, supplements are needed after 4 months. Formula-fed infants receive adequate iron for the first 12 months of life with standard infant formula.

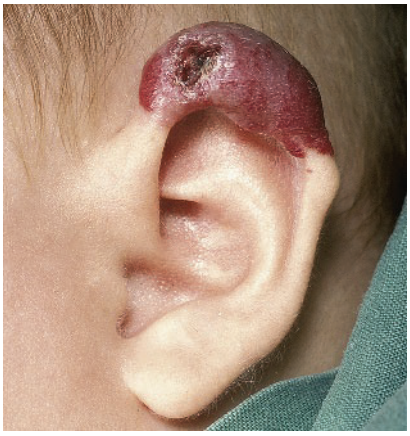

Fig. 29.1 Infantile hemangioma. Lesions grow rapidly during the first few months of life once they appear (20% at birth), but they are asymptomatic unless they bleed, become infected, or obstruct a vital structure. Complete resolution is typical before the age of 7, and no treatment is usually required. (From du Vivier A. *Atlas of Clinical Dermatology*. 3rd ed. New York: Churchill Livingstone, 2002, p. 117, with permission)

27. True or False: Breastfed infants are more likely to require vitamin D supplements than formula-fed infants.

True. The American Academy of Pediatrics recommends that exclusively and partially breastfed infants receive **oral** vitamin **D** supplementation (neonates **d**rink vitamin **D** but receive an inje[**k**]tion of vitamin **K**) shortly after birth and continue until they are weaned and begin consuming formula or whole milk. Formula-fed infants do not require vitamin D supplements in the United States because all formulas are already supplemented with vitamin D.

28. Distinguish between caput succedaneum and cephalohematoma. How are these conditions treated?

Both conditions are noted in newborns after vaginal delivery. **Caput succedaneum** defines diffuse swelling or edema of the scalp that crosses the midline, is benign, and requires no further investigation or treatment. A **cephalohematoma** is a subperiosteal hemorrhage that does not cross suture lines and is usually benign and self-resolving but in rare cases may indicate an underlying skull fracture. Order a radiograph or computed tomography (CT) scan of the head to rule out a fracture.

29. How are cavernous hemangiomas treated?

Cavernous hemangiomas are benign vascular tumors that are often first noticed a few days after birth. They tend to increase in size after birth (sometimes becoming quite large) and gradually resolve within the first 2 years of life (Fig. 29.1). The best treatment is to do nothing but observe and follow.

30. When does the anterior fontanelle usually close? What disorder should you suspect if it fails to close?

The anterior fontanelle is usually closed by **18 months** of age. Delayed closure or an unusually large anterior fontanelle may indicate hypothyroidism, hydrocephalus, rickets, or intrauterine growth restriction (IUGR).

31. When should the Moro and palmar grasp reflexes disappear?

These primitive reflexes should disappear by 6 months of age.

32. Name the commonly tested gross motor, fine motor, social, and verbal/cognitive childhood milestones for each age of development listed.

Age	*Gross Motor*	*Fine Motor*	*Social*	*Verbal/ Cognitive*
3 mo	Roll	Grab	Smile	Laugh
6 mo	Sit up	Scraping/raking grasp Switch hands; move objects from one hand to the other	Stranger anxiety	Schmooze/coo incoherently

Age	*Gross Motor*	*Fine Motor*	*Social*	*Verbal/ Cognitive*
9 mo	Pull self up to standing position	Pincer grasp Able to play pat-a-cake	Parent/ separation anxiety	Can say single words ("papa") Personal: recognizes own name Object permanence
12 mo	Stand tall under own power "Walk by 1" may not follow the "T" mnemonic, but it's a nice memory hook	Track/point at objects	Nothing special	Nothing special
18 mo	Climb stairs	Uses cups and cutlery	Complains: starts throwing tantrums	Calls objects by name ("book," "dog") Potty training begins
2 yr	Uses 2 legs to run	Nothing special	2 people: will leave and return to parent but may not engage with peers yet ("two people" = *child* and *parent*)	200-word vocabulary 2-word sentences Follows 2-step commands
3 yr	Tricycle: able to ride it	Can draw a circle Rides tricycle	Three people: start playing with peers ("three people" = *child*, *parent*, *child's friend*)	Toilet trained: successful potty training complete Thousand (1000) word vocabualry Constantly asks W-H-Y (*three letters*)
4 yr	Four-limb dexterity: able to hop and balance on one leg	Draw square and cross (four sides in a square, four lines make a cross)	Figments: may have imaginary friends	Full sentences and storytelling Names at least two colors
5 yr	Uses five fingers to play with a jump rope	Uses five fingers to dress and groom self (e.g., tie shoes, button a shirt)	Nothing special	Uses five fingers to start counting (to 10)

Miscellaneous Milestone Pearls

The "appropriate" number of stacked blocks is 3x their age starting at age 1 year (i.e., a toddler should be able to stack 3 blocks by age 1, 6 by age 2, etc.).

For **premature infants** in their first 2 years of life, adjust their expected milestones by the number of weeks early they were delivered. For example, an infant born at a gestational age of 28 weeks (i.e., 12 weeks early) should be expected to reach their 6-month milestones around age 9 months (i.e., 12 weeks later), 12-month milestones around age 15 months, and so on until 2-year milestones around age 2 years, 3 months.

33. True or False: The overall trend or pattern of development is more important than the particular age at which any individual milestone is reached.

True. The exact age is not as important as the overall pattern when monitoring for dysfunctional development. When in doubt, use a formal developmental test, such as the M-CHAT (**M**odified **Ch**ecklist for **A**utism in **T**oddlers).

34. What screening and preventive care measures should be done at every pediatric visit?

Height, weight, blood pressure, and developmental/behavioral assessment should be performed during every pediatric clinic visit. Also be prepared to provide anticipatory guidance (e.g., counseling/discussion about age-appropriate concerns) to the child's parents during each visit.

35. Define failure to thrive. What causes it?

There is no consensus definition for failure to thrive, but commonly used definitions include a head circumference, height, or weight less than the 5th percentile for age; a weight less than 80% of ideal weight for age; or a weight that drops two or more major lines on the growth curve. Failure to thrive is most commonly due to psychosocial or functional problems. Watch for signs of neglect and child abuse. Organic causes usually have specific clues to trigger your suspicion.

36. What conditions are suggested by obesity in children?

Obesity is usually due to overeating and too little activity (>95% of cases). Less than 5% of cases are due to organic causes (e.g., Cushing syndrome, Prader-Willi syndrome).

37. True or False: Screening and preventive care do not have to be addressed during a pediatric clinic visit if the chief complaint is unrelated to well-child development.

False. Screening and preventive care are an important part of every patient encounter—adult or child. Your exam questions may try to fool you on this point. For example, consider a mother who complains that her 4-year-old child sleeps 11 hours every night. The answer to the question, "What should you do next?" may not be about sleep patterns at all, but rather should be to perform any routine screening procedure that you would expect a 4-year-old child to receive (e.g., an objective hearing exam).

38. What are the frequently tested items under the umbrella of primary prevention using "anticipatory guidance"?

Tell parents the following:

- Keep the water heater under 120°F.
- Have functional smoke detectors in the home.
- Have the phone number for poison control handy.
- Advise smoking cessation if anyone in the home uses tobacco or vape products.
- Use proper car restraints (e.g., child safety seat until 2 years, booster seat until height is 4'9").
- Put the infant to sleep on the side or back ("Back to Sleep") to help prevent sudden infant death syndrome (SIDS).
- Advise against sharing a bed with the infant due to risk of SIDS or accidental smothering.
- Do not use infant walkers (they cause injuries).
- Watch out for small objects (they may be aspirated).
- Do not give honey before 1 year of age (risk of unintended *botulinum* poisoning).
- Do not give cow's milk before 1 year of age.
- Introduce solid foods gradually, starting at 4 to 6 months of age.
- Supervise children in bathtubs and swimming pools.
- Minimize screen time (televisions, computers, portable devices).
- Get plenty of physical activity (at least 60 minutes daily).

39. How often should height, weight, and head circumference be measured? What do they signify? Which measurements will be the first and last to become abnormal if the child is not developing appropriately?

Height and weight should be measured routinely during every clinic visit, well into adulthood. Head circumference should be measured at every visit until the patient is 2 years old. All three parameters are markers of general well-being; abnormal values may suggest disease. The first measurement to become abnormal is weight (a child can lose weight but cannot shrink); the last measurement to become abnormal is head circumference because you are essentially waiting for the child's body to outgrow the head.

40. What if a child has low height, weight, or head circumference compared to peers?

The trend or pattern over time along a plotted growth curve will tell you more than any single measurement. You may be asked to interpret these growth curves on the USMLE. If a child has always tended low or high compared to their peers, the pattern is generally benign. A patient who crosses two or more growth curves is more worrisome. Parents commonly bring in a child who they believe is experiencing delayed physical growth or delayed puberty. You need to know when to reassure and when to do further testing and questioning.

41. What conditions should you consider in a child with an abnormal head circumference?

Increased head circumference may indicate hydrocephalus or tumor, whereas decreased head circumference may indicate microcephaly (e.g., TORCH infections: congenital **t**oxoplasmosis, **o**ther [e.g., syphilis, HIV], **r**ubella, **c**ytomegalovirus, **h**erpes simplex infection or Zika virus; aneuploidy). Again, the pattern of head circumference over time (plotted on a growth curve) is most helpful in defining pathology.

42. True or False: Children have the same range of normal vital signs as adults.

False. Children have *lower* baseline blood pressure and *higher* baseline heart and respiratory rates than do adults. In addition, children often have different acceptable ranges of lab values. For example, a healthy child's hemoglobin/hematocrit value is normally higher at birth and lower throughout childhood compared with that of an adult. In addition, the renal, pulmonary, hepatic, and central nervous systems are not fully mature or functional at birth.

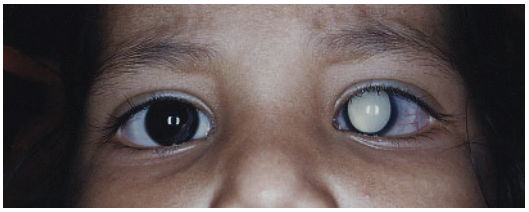

Fig. 29.2 Leukocoria (white pupillary reflex) is the most common presenting feature of retinoblastoma and may be first noticed in family photographs. (From Kanski JJ. *Clinical Diagnosis in Ophthalmology*. 1st ed. St. Louis: Mosby; 2006 [fig. 9.94.] Courtesy U. Raina.)

43. When are hearing and vision screened?

Hearing and vision should be measured objectively at least once by 4 years of age. After that initial screen, measure every few years until adulthood or more often if the history so dictates.

44. In what clinical situations should you worry about hearing loss in pediatric patients?

- Bacterial meningitis, especially by *Hemophilus influenzae,* which may cause sensorineural hearing loss of the vestibulocochlear nerve (cranial nerve 8)
- Congenital TORCH infections
- Measles or mumps
- Chronic middle ear effusions or chronic or recurrent otitis media
- Use of ototoxic drugs (e.g., aminoglycosides, furosemide)

45. What is the red reflex? What does an abnormal red reflex suggest?

When a penlight is shined at the pupil, you usually see red because of the underlying fundus. Check for the red reflex at birth and routinely thereafter to detect congenital cataracts, strabismus, or ocular tumors. If a cataract, strabismus, or ocular tumor is present, the red reflex disappears. For cataracts and tumors, you may see white instead of red—this finding is known as leukocoria and is classically due to retinoblastoma (Fig. 29.2).

46. True or False: Before a certain age intermittent strabismus is normal.

True. It is normal for infants to have occasional ocular misalignment (strabismus) until 4 months of age. After 4 months (or with constant eye deviation), strabismus should be evaluated and managed by an ophthalmologist to prevent possible blindness in the affected eye.

47. How is strabismus managed if it persists beyond age 3 months?

Patch the **good eye** to force the abnormal eye to develop. Severe strabismus may require surgical intervention.

48. How and when should pediatric patients be screened for iron-deficiency anemia?

According to AAP guidelines, a risk assessment for iron-deficiency anemia should begin at 4 months of age, with hemoglobin and hematocrit measured at 1 year of age. Risk factors to assess for include prematurity, low birth weight, excessive ingestion of cow's milk before 1 year of age, low dietary iron intake, and low socioeconomic status.

49. True or False: Screening children for renal disease with a urinalysis is not recommended.

True. However, you should screen for congenital/anatomic abnormalities (e.g., vesicoureteral reflux) after a febrile urinary tract infection in children between the ages of 2 months and 2 years by getting an ultrasound plus either voiding cystourethrogram (VCUG) or radionuclide cystogram (RNC). Screening after 2 years of age is more controversial and likely will not be asked on the USMLE.

50. How and when do you screen for lead exposure?

Screening for lead toxicity is controversial. Routine screening is no longer recommended. However, all Medicaid-eligible children must be screened. Consider screening high-risk children (those who live in old buildings, have a sibling or playmate with lead toxicity, eat paint chips, live near a battery-recycling plant, or have a parent who works at a battery recycling plant). Screen for lead exposure by ordering a serum lead level. If the initial lead level is abnormally high, closer follow-up and intervention are needed. The best first step is to stop the exposure.

51. When should children be screened for tuberculosis?

Universal screening for tuberculosis is not recommended. There is no need to screen children who have no risk factors. Risk assessment should occur regularly until 2 years of age, then annually. Test those at high risk (family member with tuberculosis or a positive tuberculosis test, a child born in a high-risk country, a child who has traveled to a high-risk country, or a child who has consumed unpasteurized milk or cheese).

52. True or False: A diagnosis of encopresis or enuresis cannot be made before a certain age.
True. Encopresis is considered normal until age 4 years and enuresis is normal until age 5 years. This diagnostic point is obviously important when the parent complains because both are normal findings in a 3-year-old child. If the problem persists, rule out physical problems (e.g., Hirschsprung disease, urinary tract infection) and treat with behavioral modification (e.g., "gold star for being good" charts, alarms, biofeedback) as the first-line treatment. Desmopressin and imipramine may be used for refractory cases of enuresis.

53. What are some complications of constipation in young children?
Common complications include encopresis, enuresis, anal fissures, and hemorrhoids. Constipation can be associated with toilet training, entry to daycare/school, transition to solid diet, and introduction or excessive consumption of cow's milk.

54. What should you always consider when a question mentions that a child with flulike symptoms was given aspirin?
Reye syndrome. Reye syndrome causes encephalopathy and/or liver failure after aspirin is given for influenza or varicella infection. Use acetaminophen in children to avoid this rare (but often tested) condition.

55. What high-yield information do you need to know about immunizations for the USMLE Step 2 exam?
High-yield information includes the recommendations for special patient populations (e.g., give pneumococcal vaccine to patients with sickle cell disease or splenectomy) and notable vaccine contraindications (no live vaccines such as measles-mumps-rubella or varicella for immunocompromised patients or pregnant patients).

56. Which vaccine is contraindicated in pediatric patients with a history of intussusception?
The **rotavirus** vaccine is contraindicated for pediatrics with a history of intussusception.

57. True or False: Pediatric immunizations for preterm infants should be given based on chronologic age.
True. The only exception is for the hepatitis B vaccine. If the birth weight is less than 2 kg, the infant should be immunized by hospital discharge or 1 month of age (whichever event is earlier).

58. True or False: Most children need fluoride supplementation.
False. Because most water is fluoridated, supplementation is not needed. However, if a child lives in an area where the water is inadequately fluoridated (rare) or the child is fed exclusively from premixed, ready-to-eat formulas (which use nonfluoridated water), fluoride supplements should be given.

59. When should you recommend that a child see a dentist for the first time?
The AAP and American Academy of Pediatric Dentistry (AAPD) both recommend that a child see a dentist within 6 months of first tooth eruption or at 12 months of age, whichever comes first.

60. What clinical findings would you expect in milk protein allergy? How do you manage it?
Milk protein allergy is the most common food allergy in young children and typically presents in the first few months of life with failure to thrive, regurgitation, atopic dermatitis, and occasionally bloody stools. Management involves avoidance of any dairy or soy in the maternal diet for breastfed infants and use of hydrolyzed formula in formula-fed infants. The condition typically self-resolves eventually.

61. True or False: Button battery ingestion in an asymptomatic, clinically stable child requires immediate endoscopic removal.
False. In a clinically stable patient, the first step involves obtaining a chest x-ray to determine the location of the ingested button battery. If the battery is located in the esophagus, endoscopic removal is warranted. If the battery is located beyond the esophagus, it is safe to observe for excretion of the object via stool and follow-up x-ray.

62. What are clinical signs of a breath-holding spell in a child?
In a breath-holding spell, the child has an episode of apnea followed by collapse, limpness, and loss of consciousness with a quick return to baseline. Triggers are often minimal and include anger/frustration (cyanotic type) or minor fall/head injury (pallid type). Breath-holding spells are self-limited and do not affect neurologic development.

63. What are the clinical findings associated with growing pains? How is the condition managed?
Growing pains occurs in children ages 3 to 12 years and typically causes bilateral lower extremity pain, primarily at night. Parents should be reassured that the condition self-resolves. Symptoms can be managed with leg massages, heat, stretching exercises, and nonopioid analgesics (e.g., acetaminophen, ibuprofen).

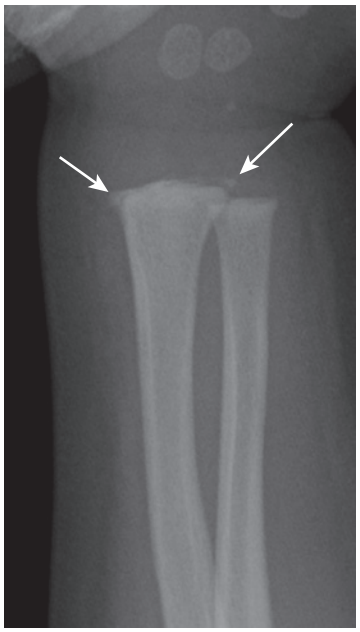

Fig. 29.3 Metaphyseal corner fractures *(solid white arrows)* and small avulsion-type fractures of the distal radius are findings characteristic of child abuse. (From Herring W. *Learning Radiology: Recognizing the Basics*. Saunders; 2020:324-338.)

64. What findings should make you suspect child abuse?

- Failure to thrive
- Multiple fractures, bruises, or injuries in different stages of healing
- Concentric cigarette-shaped burns
- Signs of intentional burns (e.g., scald injuries from intentional immersion that are symmetric with sharp lines of demarcation)
- Metaphyseal "bucket handle" or "corner" fractures (Fig. 29.3)
- Shaken baby syndrome (retinal hemorrhages or subdural hematomas with no external signs of trauma)
- Behavioral, emotional, or interactional problems
- Sexually transmitted diseases
- Dissociative identity disorder (previously known as multiple personality disorder; classically due to sexual abuse)
- Whenever a parent's story does not fit the child's injury

65. True or False: You must have proof before you can report child abuse.

False. In fact, reporting any suspicion of child abuse is mandatory. You do not need proof and cannot be sued for reporting your suspicion.

66. What are the Tanner stages? When do they occur?

The Tanner stages measure the stages of puberty. Stage 1 is preadolescent; stage 5 is adult. Advancing stages are assigned for testicular and penile growth in boys and breast growth in girls. Both male and female stages also use pubic hair development. The average age of puberty (when a patient first has changes from the preadolescent stage 1) is earlier for girls than boys (10.5 years in girls compared to 11.5 years in boys). The classic first events of puberty are testicular enlargement in boys and breast development in girls.

67. True or False: A 1-month history of a painful nipple mass in a 13-year-old boy with Tanner stage 3 genitalia and who is otherwise healthy warrants further workup.

False. This situation is a common description of pubertal gynecomastia, which occurs in over 50% of male adolescents. It usually presents with a palpable mass or lump behind one or both nipples and can be painful. It can be safely observed, as the condition typically regresses substantially or self-resolves by 1 year.

68. Define delayed puberty. What is the most common cause?

In boys, delayed puberty is defined as no enlargement of the testicles by age 14 or a time lapse of more than 5 years from the start to the completion of growth of the genitals. In girls, delayed puberty is defined as no breast development (thelarche) by age 13, a time lapse of more than 5 years from the beginning of breast growth to the first menstrual period, or no menstruation by age 16. The most common cause is **constitutional delay**, a normal variant. Watch for parents with a similar history of being "late bloomers." The child's growth curve consistently lags behind that of peers, but the line representing the child's growth curve is parallel to the normal growth curve. Treatment is reassurance only.

69. What are other potential causes for delayed puberty?

Rarely, delayed puberty is due to primary testicular failure (Klinefelter syndrome, cryptorchidism, history of chemotherapy, gonadal dysgenesis) or ovarian failure (Turner syndrome, gonadal dysgenesis). Even more rarely, delayed puberty is due to a hypothalamic/pituitary defect, such as Kallmann syndrome or tumor.

70. What causes precocious puberty?

Precocious puberty is usually idiopathic but may be due to the **McCune-Albright syndrome** (triad includes precocious puberty, fibrous dysplasia of the bone, and the "coast of Maine" café au lait spots), ovarian tumors (e.g., granulosa, theca cell, or gonadoblastoma), testicular tumors (e.g., Leydig cell tumors), central nervous system disease or trauma, adrenal neoplasm, or congenital adrenal hyperplasia (CAH). CAH causes precocious puberty in boys only (due to elevated androgen levels) and is usually due to 21-hydroxylase deficiency. Obesity may also lead to precocious puberty in girls due to elevated adipose-related estrone levels.

71. True or False: If the underlying cause for precocious puberty is uncorrectable or idiopathic after diagnostic workup, patients should still receive treatment.

True. Most patients are given long-acting gonadotropin-releasing hormone (GnRH) agonists (e.g., leuprolide) to modulate the hypothalamic-pituitary-gonadal axis and ultimately suppress the progression of puberty. Among other benefits, this approach helps to prevent the short stature that may result from premature epiphyseal closure.

72. True or False: Sexually active teenaged girls need screening for chlamydial infection and gonorrhea.

True. There are high numbers of reported cases of chlamydia and gonorrhea in younger women. The Centers for Disease Control and Prevention (CDC) recommends annual screening for chlamydia for all sexually active females ages 25 and under. The CDC recommends screening high-risk sexually active females for gonorrhea.