

## 20 Questions – Pediatrics

1. Ten-4 is a mnemonic that helps identify what condition. What does it stand for?
  - a. Patterned skin injuries and unusual locations that should raise your awareness for (child) abuse.  
  

**T**-torso – (toddlers almost always have a few bruises to their anterior legs, but torso is unusual)  
**E**-ear  
**N**-neck  
**4**- younger than 4 years old (abuse peaks in infancy and during toilet training) you can also add the following if you think of it – facial injuries are usually more obvious and therefore, less common except in overt abuse cases...  
**F**-frenulum  
**A**-auricular  
**C**-cheek  
**E**-eyelid  
**S**-sclera
  
2. What are some things that should make you have a higher suspicion for abuse?
  - a. History that doesn't match the injury (this is critical – and only you, on-scene, often have the information needed to put the pieces together)
  - b. Injuries of varying age on the child
  - c. Hyper-attentive caregiver that doesn't allow the child to provide history
  - d. Child not capable of doing what is alleged (e.g. infants don't roll until 3 months – so no infant at 1 month rolls off a changing table)
  - e. Spidey sense – basically, if anything doesn't seem right to you – ask more questions, get more information, and be sure to convey your suspicions to the receiving facility – you are a mandatory reporter to Child Protective Services if you suspect abuse
  
3. Canadian C-spine rule and national emergency X-radiography utilization study (NEXUS) are used to determine likelihood for a cervical spine injury. What are the NEXUS criteria? Which one, if any, can be used in assessing pediatric cervical spine injury?
  - a. NEXUS: If a patient does not have any of the following: no focal neurological deficits, no midline spine tenderness, no AMS, no intoxication and no distracting injuries present; it is likely that their cervical spine is stable.
  - b. Canadian C-spine excluded patients <16 y/o. Nexus included patients under 18 (3,065). Found 100% sensitivity and 19.9% specificity for detecting clinical significant CSI in pediatric trauma.
  
4. What is an ALTE? What questions should you ask?
  - a. Apparent life threatening event (ALTE). It's a period of apnea and color change/choking/gagging or change in muscular tone.
  - b. Some questions that are important to ask include the following: What happened just before the episode? Was there a change in color/muscle tone? How long did it last? How many times has it happened? What did the parent do? When did the child last eat? Was the child awake or asleep when it occurred? What was the child's position?
  
5. What is your differential diagnosis for ALTE?
  - a. You can use the mnemonic "THE MISFITS"

**T**-trauma  
**H**-heart disease or hypovolemia  
**E**-electrolyte abnormalities  
**M**-metabolic abnormalities (CAH, lactate)  
**I**-inborn errors of metabolism  
**S**-sepsis  
**F**-formula dilution or overconcentration  
**I**-intestinal catastrophes (intussusception, NEC, malrotation)  
**T**-toxins (ask about home remedies also)  
**S**-seizure or CNS problems

6. What should your exam include in assessing a pediatric patient < 1 year old?
  - a. The following is not an exhaustive list but specific to infants. Remember to fully undress the infant when appropriate (not putting them at risk for hypothermia though!). Doing so allows you to assess subtle findings of respiratory distress, rashes, evidence of possible NAT or sepsis.
    - General appearance: toxic or not, punky, well appearing, evidence of increased work of breathing (nostrils flaring?)
    - VS: are they appropriate for their age?
    - Skin: Are there rashes? Where are they found? Check mouth and palms/soles. Presence of ecchymosis?
    - Head: Check fontanelles if present. Are they full/flat or bulging?
    - Eyes: Check sclera and pupils.
    - Mouth: mucous membranes moist or dry, swelling or rash
    - Chest: auscultation of lungs, assessing chest wall movement
    - Cardiovascular: presence and equalness of pulse, presence of murmurs, capillary refill <3 sec?
    - Abdomen: palpate for masses/distention/tenderness
    - Extremities: strength
    - Neurologic examination: Are they responding to their environment appropriately? (tracking or startled by noise), tone (can they grip your finger, hold their head up, trunk support)
7. How do you identify a toxic appearing pediatric patient?
  - a. Lethargy, cyanosis, tachypnea/increased work of breathing, poor tone/limp, failure to respond to caregivers/their environment (poor or absent eye contact).
8. Should you recommend transport/evaluation of a 3 week old with a fever? Even if their older siblings are sick also?
  - a. Yes on both counts. Infants of that age are considered to have immune systems that are not fully developed, making them more susceptible to illness. If the patient is <28 days old and their temperature is >38 C they will be undergoing an extensive workup in the ED which includes: labs (CBC/CRP), cultures (blood/urine), urinalysis, CXR and lumbar puncture.
  - b. What if the patient is < 28 days old and their temperature is recorded as <38 C?
    - Labs (CBC/CRP), culture (blood/urine), urinalysis, CXR → then risk stratify → low (admit) vs high (LP)

9. You are dispatched to an unknown medical and find a child with a fever and rash (see picture). The rash just started and is rapidly progressing. What condition should be on your differential diagnosis?

- a. Disseminated meningococemia – often fatal and rapidly progressive – first appears on extremities usually – infants and teens are at highest risk



10. You are dispatched to a school where the RN tells you the patient (4 y/o) was staring off, they were smacking their lips and remained awake. What is your differential diagnosis and how could you evaluate the patient?

- a. Seizure (most likely – petit mal), cardiac/arrhythmia, hypotension, electrolyte abnormality, head injury, intracranial process
- b. ECG, glucose check, neurological exam (including mental status, cranial nerve exam, motor, coordination, sensation and/or gait), vital signs, physical exam (paying close attention to tongue injury or incontinence)

11. What are the differences between simple and complex febrile seizure?

- a. Simple: is generalized, lasts less than 15 minutes and occurs in a neurologically and developmentally normal child between the ages of 6 months and 6 years of age.
- b. Complex – anything else J

12. How does appendicitis present in a child?

- a. Often times it can present in a non-specific manner such as: vomiting, abdominal pain, fever, diarrhea, irritability and/or right hip pain and therefore is commonly missed.

13. What is considered a GI emergency when it comes to ingested objects?

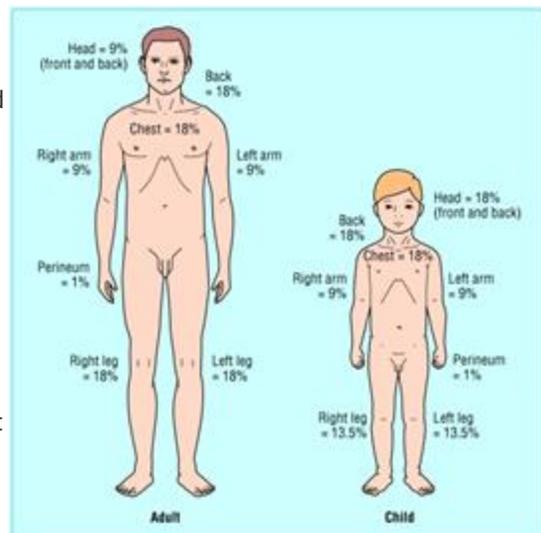
- a. Usually this occurs in toddlers and include: coin, button battery, sharp object, or has difficulty controlling secretions or if in their esophagus for greater than 24 hours.

14. You are dispatched to the home of a highly irritable or inconsolable infant that otherwise appears healthy. What can you look for?

- a. The key is the physical exam. Check digits or genitals for a hair tourniquet or paraphimosis (foreskin of penis is trapped in a retracted manner). Skin for bites or stings. You should also consider a corneal abrasion of the eye.

15. Which is more accurate in estimating burn surface area involved in children, *Wallace rule of nines* or *Lund and Browder chart*?

- a. *Rule of nines* is a good way for estimating medium to large surface area burns in adults but it is not as accurate in children.



- b. The *Lund and Browder chart* is the most accurate if used correctly in adults or children. It compensates for body shape at a given age. At any age you can use the patient's palm to estimate 1% BSA – remember that first degree burns DON'T get included in the total (but that burns that initially appear 1st may evolve to be 2nd degree)

16. Most unexpected pediatric (<18 y/o) out of hospital cardiopulmonary arrests occur in what age group?

- Children younger than 2 years. Most of these before the age of 1 are due to SIDS. Overall, pediatric death from illness is more common than from injury but after the age of 12 months, injury is more likely.

17. Do ECGs differ in pediatrics compared to adults?

- Yes they do differ. Their hearts are obviously smaller so it takes less time for conduction to occur therefore, PR and QRS duration are shorter and morphology is different (T wave inversions in anterior leads are normal). Please see attached normal 4 year old ECG at the end of the 20 Questions.

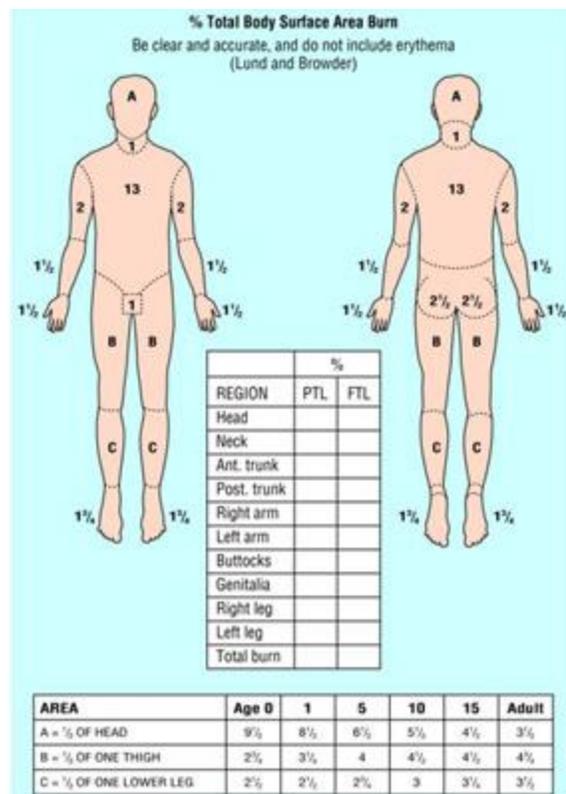
18. You are dispatched to a home for an ingestion.

When you arrive, you are greeted by a concerned mother who tells you that she found her 2 y/o playing with an open bottle of camphor oil (which she uses on herself to help with decongestion). It is unknown if the child has consumed any because it was unwitnessed and the bottle is not new. The child is well appearing, interactive, in no acute distress with normal vital signs. Does the child need to be evaluated at a hospital? If so, does it matter how the child arrives there?

- The child will need to be evaluated at a medical center due to inability to rule out ingestion of this substance. They should be transported by ambulance in the event they develop symptoms related to toxicity of this substance which includes seizures. Five mL (1 tsp) of 20% camphor oil or >50 mg/kg can be lethal.

19. Which medications or substances are referred to as "one pill can kill" when it pertains to pediatric ingestions?

- Calcium channel blockers (Verapamil, Nifedipine and diltiazem) and beta-blockers (metoprolol, etc.)
- a. Sulfonylureas
- b. Opiates
- c. Amphetamines (MDMA or methamphetamine)
- d. Sodium channel blockers (chloroquine, tricyclics)
- e. Theophylline
- f. Organophosphates and carbamate insecticides
- g. Paraquat



- h. Toxic alcohols
  - i. Hydrocarbons (solvent, eucalyptus oil, kerosene)
  - j. Camphor
  - k. Naphthalene
  - l. Clonidine
20. Why is it that these ingestions in pediatrics can lead to significant injury or fatality?
- . Low body mass for dose
  - a. Younger children are more likely to consume bad tasting items
  - b. Young children have less developed metabolic pathways. In the case of processing toxins, they use sulfonation as opposed to glucuronidation. Interestingly, this may explain what appears to be a young child's tolerance to Tylenol induced hepatotoxicity.

Thanks to Jackie Gadbois, MD for guest-writing this month's edition!

Normal pediatric ECG – age 4 (T waves inverted in anterior leads should transition to upright by age 7-10)

