CHILD ABUSE

Child Abuse, Case #2

Written by Coral Steffey, M.D.

A two-year-old presents to the Emergency Department after breaking her arm during a fall. The child was seen six months ago with a broken leg. What are your concerns? How would you evaluate this child?

Review of Important Concepts:

Teaching points for the student

1. Identify that repeated fractures in a young child are abnormal.
2. Develop a differential diagnosis for multiple fractures in a toddler.
3. Understand the diagnostic workup for a child with a history of multiple fractures.
4. Identify types of fractures that are common to specific age groups, and types of fractures more concerning for inflicted injury.
5. Understand the role of child development in the evaluation of fractures.

Historical Points

- What are the child's developmental abilities?
  Are the activities leading to the injury described by the parents consistent with the child's age? As a normal two year old, it is possible that this child may injure herself, and even sustain a fracture during active play. As with any pediatric injury, it is essential to obtain a thorough history of the injury and developmental history in order to determine whether the injury is consistent with the child's developmental abilities.
- Are there illnesses that run in the family that might predispose the child to fractures?
  Osteogenesis imperfecta is a rare genetic disorder that effects collagen, and results in increased bone fragility. Many children with OI have a positive family history, however most cases are due to new mutations.
- Does the child have any medical problems that might predispose to fractures?
  Multiple fractures may be a sign of underlying medical illness, but are more commonly indicative of abusive injury.
- What is the child's diet?
  Dietary and family histories are also important. Though rickets is an unusual diagnosis in the United States, children with intestinal malabsorption, end-stage kidney disease, and those taking seizure medications are at increased risk. Also exclusively breastfed infants and children on a strict vegan diet may not receive adequate Vitamin D and calcium to prevent rickets.

Physical Exam Findings

Perform a complete physical exam assessing for patterned marks, bruises, or swelling indicative of bony injury in another location.

Clinical Reasoning:

1. What studies might you consider to further evaluate this child?
   A skeletal survey is the first study typically ordered to evaluate children with concerns for physical abuse, particularly in the setting of fractures. A minimum of 19 individual radiographs are obtained, including dedicated films of the hands, feet, all long bones, chest, pelvis, and skull. The skeletal survey not only evaluates for unsuspected fractures, including healing fractures, but can also be helpful in ruling out medical conditions as the etiology of a fracture.

2. How might these study results affect your level of concern for abuse?
   a. The findings of a skeletal survey, in conjunction with the clinical history and the child's developmental abilities, can either increase or decrease suspicion for inflicted injuries.
   b. In contrast, cupping or widening of the metaphases, osteopenia, or bowing of the leg bones may be revealed by a skeletal survey, suggesting rickets as the etiology of multiple fractures. In osteogenesis imperfecta, radiographs may reveal thin bone cortex, wormian bones, or bone deformities.

3. Are there findings that are pathognomonic for abuse?
   There are no fractures that are pathognomonic for abuse, though some fractures are more concerning for inflicted trauma.
   a. Rib fractures are always concerning for child abuse, particularly posterior rib fractures that result from squeezing pressure on an infant's chest.
   b. Oblique, or "spiral" fractures are concerning when they occur in the femur or humerus, particularly in a non-ambulatory child. However, children ages 1-2 are prone to falls, often with a torsional component. In fact, spiral fractures of the lower tibia, known as "toddler fractures," are a relatively common injury in this age group and do not signify abuse.
   c. Fractures of any type in non-ambulatory children are of particular concern for possible child abuse.
   d. Metaphyseal fractures, also known as "corner" and "bucket-handle" fractures, are found at the ends of the long bones and are concerning for abusive injury. Specifically, these result from flailing of the limbs, and often become evident after a shaking injury.

Suggestions for Learning Activities:

- Review radiologic studies including normal pediatric films, as well as examples of spiral fractures, metaphyseal fractures, rib fractures, and toddler fractures.
- Discuss developmental milestones that would affect the plausibility of accidental injury.

Other Resources:

- Davis, HW, Carrasco, MM. Chapter 6. Child Abuse and Neglect. Zitelli & Davis Atlas of Pediatric Physical Diagnosis, 4th ed. Pp 171-178.

Child Abuse, Case #3

Written by Coral Steffey, M.D.

A seven-year-old female patient presents with vaginal discharge. In addition to poor hygiene, what else is in the differential diagnosis?

Review of Important Concepts:

Teaching Points

- Identify that vaginal discharge in pre-pubertal girl may be the result of sexual abuse, but can also be caused by a variety of medical conditions.
- Develop a differential diagnosis for vaginal discharge in a child.
- Identify key components of the history required to evaluate a child with vaginal discharge.
- Understand the appropriate physical exam technique for evaluating a child with vaginal discharge.

Historical Points

- When did the discharge begin?
- Does it have a particular color, consistency, or odor?
- Does the child complain of itching or pain?
- Has the caregiver had any prior concern for sexual abuse?
- Have there been any new caregivers?
- Is the child responsible for her own toileting hygiene?
- Does she have any history of urinary tract infections or vaginal discharge?
- Does the child have other medical problems, such as diabetes?
- Has the child recently taken antibiotics?

Physical Exam Findings

Perform a complete physical exam, including a genital exam and anal exam.

1. Explain the exam to the child in developmentally appropriate terms. Restraint during a genital examination is not appropriate; typically, with enough time and encouragement the child can cooperate and if not then consultation with a pediatric gynecologist or child abuse pediatrician will be necessary.

2. In cases where an exam is essential, e.g., where there is active bleeding, an examination under anesthesia may be necessary if the child is overly anxious and unable to cooperate.

3. Instruments and probes, including a speculum, should NOT be inserted into the vagina of a prepubertal child.

4. During the exam, evaluate the source of the discharge and assess for injuries and foreign bodies. If a foreign body is suspected but poorly visualized, a syringe filled with sterile water or saline may be used to irrigate the vagina and "float out" the object.

Clinical Reasoning

1. What resources may be available to help perform the physical exam?
   a. Providers specially trained in child abuse pediatrics are valuable resources when evaluating a prepubertal girl with vaginal discharge, especially if sexual abuse is suspected. If a child has genital injuries or a foreign body that requires sedation for a complete evaluation, a gynecology consult may be helpful.
   b. Also, many hospitals have child life specialists who can help the child understand what will happen during the exam, or may help to reassure or distract an anxious child during the genital exam.

2. What laboratory tests would be useful for evaluating a girl with vaginal discharge?
   a. Urinanalysis for ketones and glucose, as well as serum glucose can be useful for evaluating a child with symptoms of diabetes.
   b. Microscopy with KOH may be useful for evaluating candidal infection.
   c. Although DNA amplification probes can be used to diagnose Chlamydia and Gonorrhea in young children, the CDC recommends vaginal Gonococcal culture as the gold standard for diagnosis of a Gonococcal infection.

3. What pathogen would you expect to culture from a vaginal discharge caused by retained toilet tissue?
   Skin flora, particularly staph aureus are the most common bacteria associated with vaginal foreign body.

Possible Diagnoses

1. Poor hygiene or poor toileting technique is often a consideration in young children presenting with vaginal discharge, especially for preschool-aged girls who have recently mastered toilet training. A careful history can help to distinguish this from other medical conditions. For instance, if the caregiver reports wetness, odor, and minimal staining to the child's underwear, one consideration is reflux of urine into the vagina. This typically occurs in overweight girls who sit on the toilet with their knees close together. During toileting, urine becomes trapped between the labia majora, and refluxes into the vaginal vault. Over time, urine leaks out into the underwear and can be confused with vaginal discharge or enuresis.

2. The vaginal environment of pre-pubescent girls is less conducive to fungal growth than the adult vagina. However girls may develop candidal infections in the setting of untreated diabetes mellitus, or after disruption of normal flora due to antibiotic therapy. The discharge is typically described as white, with a paste-like consistency, and there may also be associated pruritis.

3. Vaginal pinworm infestation is another pruritic condition that may be mistaken for vaginal discharge. The patient (or other contacts) may have a history of perianal irritation or itching.

4. Foreign body is a more common cause of vaginal discharge in prepubertal girls. Caregivers are typically unaware of a foreign body, so history may be unrevealing. Small pieces of toilet tissue can be inadvertently retained in the vagina. Occasionally a child will insert a small object, such as a piece of a toy, into the vagina. Mucus and proliferation of bacteria around the foreign body eventually result in discharge, which may be green, yellow, brown, or white in color, and may emanate a foul odor.

5. When a prepubertal girl has vaginal discharge, the caregiver may have considerable anxiety about possible sexual abuse. Gonorrhea, Chlamydia, and trichomonas can each cause vaginal discharge in a prepubertal child, and should be a diagnostic consideration. When there is concern for sexual abuse it is important to avoid discussing this concern in front of the child. Any information volunteered by the child should be documented carefully, using the child's own words, but the child should not be questioned by medical providers.

Suggestions for Learning Activities:

- Review appropriate examination positions for prepubertal genital exams, including frog-leg and knee chest positions.
- Review normal anatomic genital findings for prepubertal girls.

Other Resources:

- Workowski, K., Berman, S. Sexually Transmitted Diseases Treatment Guidelines, 2010. Morbidity and Mortality Weekly Report (MMWR). **December 17, 2010 / 59(RR12);1-110.**
- Finkel, M, Giardino, A. (2009). Medical Evaluation of Child Sexual Abuse: A Practical Guide (2nd ed). Elk Grove Park, Il: American Academy of Pediatrics

Child Abuse, Case #6

Written by Susanne Tropez-Sims, M.D.

A nine-month-old boy has a history of poor weight gain for several months. His weight has fallen from the 50% to the 10% over the past four months. During a hospitalization for poor weight gain he had a normal physical examination, normal laboratory values, and demonstrated excellent weight gain on an age-appropriate diet. Now one month following discharge from the hospital he has lost weight. What would you do for this child? Discuss the medical, legal and social implications of your actions.

Definitions for Specific Terms:

Failure to thrive (FTT) - Growth consistently below the 3-5th percentile or identify growth changes that cross two growth percentiles over a short period of time. Traditionally identified as organic or non-organic, organic is an underlying medical condition that may affect growth parameters. Non-organic is caused from psychosocial issues in children less than 5 years of age. But children can have both organic and non-organic etiology to their poor weight gain, sometimes referred to as "mixed FTT".

Review of Important Concepts:

1. Determine etiology: not enough calories; unable to absorb calories; or unable to consume sufficient calories.
2. Identify causes to non organic failure to thrive.
3. Know the difference between FTT and constitutional growth delay.
4. Growth adjustments for premature infants.
5. Skills needed in obtaining a detailed diet and social history.
6. Specific physical findings that will assist in diagnosis of FTT.
7. Identify relationship between weights, heights, and weight for height in evaluating children.
8. Consider endocrine causes of FTT as hypothyroid, pituitary dysfunction etc..
9. What constitutes chronic malnutrition?

Historical Points

- What psychosocial history questions should be asked of caregiver to assess patient and family dynamics?
- What is the detailed dietary history questions needed to be asked?
- This includes, what is fed; the amount of formula; how formula is mixed?
- How often fed?
- Any unusual dietary beliefs?
- Is infant on Women Infant Children (WIC) Food Program?
- Any causes of inadequate calories?
- Any anatomical abnormalities?
- Cardiopulmonary dysfunction?
- Any gastroenterology or neurological problems?

Physical Exams Findings

1. Perform a detailed and complete physical exam. Look specifically for: narrow face, thin extremities, prominent ribs, protuberant abdomen, wasted buttocks, hygiene neglect, flattened occiput with hair loss, and delay in social or speech development.
2. A detailed history is needed to assess a child failing to gain weight.
3. Observe social interactions. Look for avoidance of eye contact, expressionless face, note cuddling response, and handling of child with force or anger.
4. Obtain accurate growth parameter measurements and interpret findings.
5. Document linear growth, growth for age and height using CDC/NCHS or WHO charts.
   What constitutes genetic short stature?

Clinical Reasoning

1. How do you know if this is a normal growth pattern for this child?
2. When do you consider Child abuse and neglect?
3. When do you refer to Child Protective Services (CPS)/police?
   Children have three mechanisms to define failure to grow:
   a. Failure of child to be offered sufficient calories.
   b. Failure of child to consume sufficient calories.
   c. Failure of child to retain sufficient calories. To assess constitutional delay, X-rays are required. Bone age is less than chronologic age. If there is no clinical reason for child's poor weight gain CPS should be involved in managing this patient.
4. What labs, if any, do you need to make a diagnosis?
   a. No labs until diet management is tried for one week and failed unless physical exam and history dictates otherwise. Clearly, a "shot-gun" approach where "all known labs" are ordered is discouraged since unless indicated by history or physical, such an approach is unlikely to yield a result that will assist in working through the differential diagnosis.
   b. Chronic Malnutrition – Labs Needed:
      - CBC with diff
      - Lead level
      - U/A
      - Bone age to determine familial short statue
      - Endocrine or nutritional
      - Thyroid function (TSH, IGF-1 and IGF BG-3)
      - Test for GE Reflux and malabsorption
      - Organic and amino acids or a sweat test (if needed)

6. What psychosocial diagnosis needs to be entertained?

7. What organic disease should be considered?

8. How do you know if growth might be normal for this child?

9. When do you decide it is Child Abuse and Neglect?

Diagnoses

1. Genetic Short Stature/ Constitutional Short Stature
2. Nutritional Deprivation
3. Medical History
4. Psychosocial Stresses
5. Organic Diseases
6. Malnutrition
7. Child Abuse or Neglect

Other Resources

- Nelson's Textbook of Pediatrics, Editors: Behrman, Klugman, Jenson, 17th Ed.
- Kirkland and Motil, uptodate.com/contents/etiology-and-evaluations-of-failure-to-thrive-undernutrition Jan 2011

Child Abuse, Case #7

Written by Susanne Tropez-Sims, M.D.

An eighteen-month-old infant presents with scald burns to the buttocks and legs. The parents report the child "turned on the hot water tap while playing in the bathtub". How would you differentiate an accidental burn from an inflicted burn?

Definitions for Specific Terms:

Forced immersion burns- These burns have a characteristic pattern that typically consist of sharply demarcated edge pattern lesions often in a stocking and glove like distribution, rare or no splash marks and owing to protective reflexes that cause the skin to be tightly opposed in the flexed regions such as the femoral/genital area to be free of injury.

Splash burns- This burn pattern consist of irregular burn markings and different degrees of burned areas due to splashing or flailing to get away from burning substance.

Spill pattern burns- These burns typically occur when a toddler reaches for a hot liquid above their head and it falls on top of them. We'd expect the hottest liquid to be at the point of impact, often the face or shoulder, then it cools as it flows down the child's skin thus have an arrow like burn pattern.

Review of Important Concepts:

Historical Points

- Obtain complete history of incidence. Including:
  - When did injuries occur including date time and where?
  - When was it noticed?
  - Who witnesses it?
  - How child was initially cared for after the incident?
  - What was child like after incident?
  - What did the care provided do after the injury?
  - What was the length of time from injury to seeking help? (remember, a burn might progress to blistering over time so once progression is noted, one would expect a prudent layperson to bring the child for care)
- Developmental history
- Social environment
- Assess plausibility of information surrounding incident.

Physical Exam Findings

What would you look for specifically on physical exam to assist in determining accident vs. non-accidental injuries?

a. Note the injury pattern
b. Evidence of multiple old and new injuries
c. Injuries in different stages; poor hygiene
d. Pathognomonic injuries

e. Look for fractures.

Clinical Reasoning

1. What would raise concern that this may be an inflicted injury?
   a. Caregiver provides inconsistent history and changing it over time.
   b. Data is not consistent with trauma seen on child's physical examination.
   c. Caregiver unsure how injury occurred or claims it is self-inflicted.
   d. Delay in seeking care.
   e. Serious injuries blamed on older or younger siblings/playmates.
   f. Caregiver frequently changes healthcare facilities.

2. When would you consider reporting to Child Protection Services (CPS)?
   CPS should be notified immediately after obtaining history and initial work-up. A burn team should be available to assess situation and help with determination of suspected abuse.

3. What X-rays, if any, should be obtained?
   A complete, set of body X-rays, defined as a skeletal survey, looking for fractures of skull, ribs, long bones, pelvis, hands and feet. CT and MRI if physical exam deems necessary.

Diagnosis:

Child abuse secondary to forced immersion burn.

Other Resources:

- Reece, R and C Christian Child Abuse Medical Diagnosis and Management 3rd ed. 2008.
- Giardino A, Giardino E. Child Abuse and Neglect: Physical Abuse emedicine.medescape.com/article/915664-print Dec 2008.
- Maguire S, et.al. A systemic review of the features that indicate intentional scalds in children. Burns 2008 Dec;34(8):1072-81. Epub 2008. PMID: 18538478.
- Herndon D. Total Burn Care 4th ed. Chapter 60. Elsevier, 2011 in press.