WHAT YOU DON’T KNOW (OR LOOK FOR) CAN HURT YOU

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DISCLOSURE

Jennifer Clarke, MD discloses the following relationships:
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GOALS

• Identify clinical exam findings that may indicate abuse and warrant further work-up
• Plan a systematic evaluation for a child presenting with concerning findings/injuries

OUTLINE

• Case 1 – Bruising in an Infant
• Case 2 – Bruising in a 3-year-old
• Case 3 – Bruising in a 16-month-old
• Cases 4 & 5 – CML’s
• Case 6 – Fussiness and Vomiting in a 2-month-old
• Case 7 – Starvation
• Case 8 – Allergic Reaction
<table>
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<th><strong>BRUISING</strong></th>
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<td>The most common manifestation of physical abuse.</td>
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<th><strong>CHILD #1</strong></th>
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| • 2 month old boy brought to his pediatrician for “bleeding from the mouth.”  
• On exam, he had a torn frenulum and bruising over his head, both eyes, and groin. |

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<th><strong>THIS CASE IS IMPORTANT BECAUSE</strong></th>
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| • This baby was seen at a 1 month Well Child Check with an *abdominal* bruise.  
• Parents attributed the bruise to a 2 year old sister that must have injured him in a jealous fit, although they denied actually seeing her leave a bruise. |

• The eye bruise was attributed to the child hitting himself while in his crib.  
• The father of the child was feeding the baby when the baby suddenly started bleeding from his mouth. He was wearing a ring that may have hit the child.  
• There was no explanation for the groin bruising.
INITIAL WORKUP FOR THIS 2 MONTH OLD

- Radiology:
  - CT head (noncontrast) [recommended in all 0-6 months]
  - Skeletal survey [recommended in all under 2 years]
- Laboratory
  - CBC w/platelets, PT, PTT [infection, bleeding problems]
  - AST/ALT, Alkaline phosphatase, Lipase [rule out abdominal trauma]
  - Urinalysis [look for red blood cells to indicate urinary tract injury]
- This baby’s radiographic and lab results were normal. His injuries are highly concerning for abuse.

OUTLINE

- Case 1 – Bruising in an Infant
- Case 2 – Bruising in a 3-year-old
- Case 3 – Bruising in a 10-month-old
- Cases 4 & 5 – CMLEs
- Case 6 – Fussiness and Vomiting in a 5-month-old
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CHILD #2

- 3 yo boy visited his doctor for “fall off bicycle.”
- Patient had bilateral black eyes with no forehead hematoma.
- He was sent for a neuroblastoma workup that was negative.
- 4 days later, mother called the father to bring them to the hospital after she saw the child “fall off the bed.”
### Workup

- CT head, abdomen and pelvis
  - CT head: multiple, large scalp hematomas
  - CT abdomen/pelvis (normal)
- CBC, PT, PTT, PFA-100 (normal)
- AST/ALT/Alk phos, Lipase (normal)
- Skeletal survey (normal) — Although child was 3 years old, his extensive injuries warranted a skeletal survey.

### When do you do a bleeding workup?

### Clues to presence of a bleeding disorder in a non-mobile infant

- Petechiae at clothing line pressure sites
- Bruising at sites of object pressure, such as in the pattern and location of infant seat fasteners
- Severe bleeding disorders may also present with excessive diffuse bruising

### Factors to consider

- Child’s personal history - “easy bruising”; prolonged bleeding with injections; epistaxis; gingival bleeding.
- Family history of bleeding disorders, menorrhagia, need for transfusions during childbirth.
- Unfortunately, while there may be clues, there are no highly sensitive and specific clinical indicators of bleeding disorders.

### A few bleeding disorders

- Von Willebrand disease (multiple types) – Type 1 – 1 in 1,000
- Hemophilia A - Factor VIII deficiency - 1 in 5,000 male births
- Hemophilia B - Factor IX deficiency - 1 in 20,000 male births

### Screening evaluation for bleeding disorders in suspected physical abuse patients

- Complete blood count with platelets
- Prothrombin time (PT)
- Activated partial thromboplastin time (PTT)
- VWF antigen
- VWF activity (Ristocetin cofactor)
- Factor VIII level
- Factor IX level
- PFA-100

Pediatric hematology referral if any screening tests come back abnormal.
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CHILD #3

- 16 month old girl with a bruise to her left cheek and left flank reported by her daycare
- Mother stated 4 yo sibling hit her face with a toy. No history for flank bruise.

RIB FRACTURES

- Positive predictive value of posterior rib fractures is 95%.
- Produced by direct blows to the chest or during squeezing/shaking.
- Children with inflicted rib fractures have a high risk of mortality from the other injuries the child sustains (for example, abusive head trauma).
- At times, rib fractures are not apparent and only appear with callus formation 10-14 days after injury which is why a repeat skeletal survey in children with high suspicion of abuse is important.
CLASSIC METAPHYSEAL LESIONS

- Also known as corner, chip or bucket-handle fractures
- Series of planar microfractures of the metaphysis of the long bones
- Occurs when the extremity is pulled or twisted forcibly, or when shaken due to shearing that undercuts fragments of the metaphysis
- Usually asymptomatic
- Most common fracture found in fatal abuse cases
- Highly specific for physical abuse

SKELETAL SURVEY

Appendicular skeleton
- Arms (AP)
- Forearms (AP)
- Hands (PA)
- Thighs (AP)
- Legs (AP)
- Feet (PA or AP)
- Skull (frontal and lateral)

Axial skeleton
- Thorax (AP and lateral)
- Abdomen, lumbar spine and bony pelvis
- Lumbar spine (lateral)
- Cervical spine (AP and lateral)

OUTLINE

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CHILD #6

- 2 month old previously healthy boy. Birth history unremarkable.
- Vomiting and fussiness for one day before presenting for his 2 month well child visit. No history of fever, diarrhea or sick contacts.
- He was sent to the ER for dehydration where he was diagnosed with a viral illness. Child was rehydrated and sent home.
- No vomiting for 12 hours then began to vomit large amounts again.
- Later that night, he began seizing and EMS was called.
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**CHILD #7**

- 10 year old boy was in a foster-to-adopt home with his twin sister and younger brother.
- The children were systematically starved, made to bite each other as punishment for “stealing food” and forced to drink water when they were hungry, resulting in hyponatremic seizures.

**CHILD #7**

- Head circumference on 4/4/13 at PCP – 37 cm (10th percentile)
- Head circumference on 5/6/13 at PCP – 40.5 cm (50th percentile)
RIB FRACTURES

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RECOMMENDATIONS

History and physical dictates your workup. That being said, general guidelines:

- All babies under 6 months of age suspected of physical abuse need a head CT.
- All children under 2 years of age suspected of physical abuse or neglect need a full skeletal survey.
- Children with concerning bruising or bleeding should get a CBC with platelets, PT, PTT and PFA-100 if available. Further work-up based on clinical suspicion can be done.
- Abdominal trauma can be occult. Obtain AST/ALT/Alk phos, lipase and U/A.
- All children should be plotted on a growth chart.

TAKE-HOME POINTS

- Common things occur commonly – 1,300 per 100,000.
- Not all bruises are created equally.
- Injuries can be clinically occult.
- Findings can be subtle radiologically.
- Growth charts are our friends.
- If you don’t look for (or think about) child abuse, you may miss it.