emDocs

The EM Educator Series

The EM Educator Series: Think Twice About Your Peds Case

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Case 1: A 3-year-old female is brought in by her parents for lower extremity and perineum burns. On your exam, the burns are symmetric, and they are circumferential. When you ask how the burns occurred, the father says the patient pulled a pot of hot water off the stove.

Case 2: A 6-month-old male presents with his mom for crying and "pain all over". On your exam, his vital signs are normal. However, you find bruises on the patient's chest, abdomen, and back, all of varying colors. The mother states without prompting that "he took a tumble down some stairs yesterday and has been crying ever since".

Questions for Learners:

1) What are important pediatric milestones, and how can they assist in your evaluation for abuse?
2) What are red flags on history and examination for child abuse?
3) What are injuries that may occur with child abuse? Fractures // head trauma // abdominal trauma // burns // oral // bruises
4) What is the ED management, and who requires reporting?

Suggested Resources:

- **#FOAMed Articles:**
  - Peds EM Morsels
  - WikEM
  - Radiopaedia
  - LIFTL

- **Podcast/Video:**
  - Emergency Medicine Cases
  - Pediatric Emergency Playbook

- **Articles**
  - BMJ
  - Emergency Medicine Clinics of North America

Answers for Learners:

1) What are important pediatric milestones, and how can they assist in your evaluation for abuse?

Louwers et al. in *Child Abuse and Neglect* developed and validated a **six-question screening tool** for use the in ED. The power of this tool was that it was validated for any chief complaint – it is not an injury evaluation checklist – it is a screen for potential abuse in the undifferentiated child:

1. Is the **history consistent**?
2. Was seeking **medical help unnecessarily delayed**?
3. Does the **onset** of injury **fit with the developmental level** of the child?
4. Is the **behavior** of the child and his **interaction** with his care-givers **appropriate**?
5. Do the findings of the **head-to-toe examination match the history**?
6. Are there any **other red flags** or signals that make you **doubt the safety of the child or other family members**?

Red Flags:

- History given is inconsistent with the mechanism of injury
- Changes in caregivers report
- Significant delays in care
- Any injury to a young, pre-ambulatory infant
- Injuries to multiple organ systems
- Injuries in different stages of healing;
- Patterned injuries
- Injuries to non-bony or other unusual locations, (torso, ears, face, neck, or upper arms)
- Significant injuries that are unexplained
- Other evidence of child neglect.

2) What are red flags on history and examination for child abuse?

Child Presenting with Injury

Historical Indicators of Abuse	The Physical Exam's 6 B's of Abuse	Injuries Suggestive of Abuse
- Changing of evolving history - Injury not consistent with mechanism - Injury not consistent with developmental stage - Delay in seeking medical care - History of past injuries - Unexplained injuries/deaths in siblings	**Bruises:** Pre-mobile; TEN-4 (Torso, Ear, Neck) F.A.C.E.S. (Frenulum, Angle of Jaw, Cheek, Eyelid, Subconjuctival); Pattern; Too many **Breaks:** Needs a clear history. Unusual in very young. Ignore Toddler's Fracture **Bonks:** Worry if complex, bilateral, depressed, open, suture diathesis or occipital fractures **Burns:** Worry if bilateral, well demarcated, immersion pattern (glove & stocking) **Bites:** Unlikely to have innocent mechanism **Baby Blues:** Unexplained behavioral change	- Posterior rib fractures - Long bone fractures if <6mo - Metaphyseal fractures - Scapular fractures - Vertebral fractures - Sternal fractures - Hand/foot fractures - Facial fractures - SDH - Unexplained TBI

Consider Reporting

Screening For Occult Injuries

0-12mo:	12mo to 18 years:
Brain CT if symptomatic or concern of physical exam. Admit for MRI if no symptoms.	No need for imaging if no symptoms/concerns.

Skeletal Survey Recommendations

In general, perform in any child < 2 years old in whom you suspect abuse.

<24 mo + bruising if	12-23 mo if:	<12 mo if:	<9 mo	<6 mo + bruising:
- Concerning Hx or PE findings - No Hx of trauma to explain fracture, ***except*** Distal spiral or buckle # of tibia/fibula/radius/ulna in ambulatory patients	- Rib # - Metaphyseal # - Complex skull # - Humeral # + epiphyseal separation from fall <3 ft - Femur diaphyseal # from fall of any height	- Concerning Bruising (TEN-4, F.A.C.E.S.) - Any # ***except*** distal buckle/spiral #, linear, unilateral skull # if >6 months + good hx or clavicle # @ birth	>1 bruise in ANY location	Over bony prominences (head T-shaped area, frontal scalp, extremity bony prominences) ***except*** if a single bruise and patient presents with history of fall

Documentation Tips

History	Physical Exam	Impression
- Who is providing the history - Use quotations - Any pain - Activities that may affect forensic evidence recovery (e.g. bathing) - ROS – changes in behaviour, non-specific symptoms	- Head-to-toe - Fully expose the child – this is a trauma patient - Describe, draw or even photograph any injuries	- Summary statement - If comfortable, offer an interpretation of the findings in the context of the history

3) What are injuries that may occur with child abuse? Fractures // head trauma // abdominal trauma // burns // oral // bruises

6 B's – Bruises, Breaks, Bonks, Burns, Bites, Baby blues

Bruises

The most common abusive injury is a bruise. Kids bruise often, but certain scenarios should raise alarm bells.

A) Bruising in the pre-mobile infant.
"If you don't cruise, you don't bruise."
Pierce et al found that only 1.3% of infants less than 5 months old had bruising.
Feldman et al found that over 50% of pre-mobile infants with bruising were victim of abuse.
Make certain you base your assessment on the child's developmental stage and not absolute age.
Bruising in infants is very rare. Not all of these babies are abused but they almost always (ie, unless there was significant trauma in a public setting with multiple witnesses) warrant further evaluation for child abuse.

B) Bruising in an unusual/protected area

TEN-4 FACES Bruising Rule (Pierce 2010)
Any bruise found in any of the following locations should trigger the possibility of pediatric physical abuse:
Torso
Ears
Neck
Any bruise in a child younger than 4 months old
FACES
Frenulum
Angle of Jaw
Cheek
Eyelid
Subconjunctival Hemorrhage

Pearl: *Think of a subconjunctival hemorrhage in an infant as a bruise on the eyeball and frenulum injury as a bruise to the frenulum. These injuries are highly suggestive of abuse in the infant.*

C) Patterned Bruises
- Linear bruises to buttock (whipping, spanking, paddling)
- Linear bruising to the pinna
- Retinal bleeding
- Hand prints or oval marks
- Belt Marks – U-shaped end or associated buckle inflicted puncture wounds
- Loop marks (rope, wire, electric cord)
- Ligature marks, circumferential rope burns to neck, wrists, ankles and gag marks to comers of the mouth

D) Too Many Bruises
It is helpful when consider whether or not a patient has too many bruises to compare with bruise prone areas such as the shins.

Don't try to age/date bruises as physicians are unreliable at determining the age of bruises.
Breaks

While **there are no fractures that are pathagnomonic for abuse**, **any fracture in any age group can be abusive** depending on how the fracture was sustained. Most abusive fractures occur in children < 18 months of age so again, our highest level of suspicion should be in young children. An important exception is that of the Toddler's fracture which requires little force and can occur from simple falls.
1. **Any fracture in a nonambulatory infant or child**
2. **Femur fracture in an infant < 12-18 months of age**
Baldwin 2011: The odds of a femur fracture being abuse rather than accidental trauma was 19 times greater for children < 18 mo of age.
3. **Humerus fractures in an infant < 18 months of age**
Pandya 2010: Children < 18 mo with a humerus fracture had a 32 greater odds of being the victim of abuse.
Location: Proximal and mid shaft humeral fractures are more likely due to abuse whereas distal humerus/supracondylar fractures are less likely to be due to abuse.
4. **Multiple fractures and/or an unexpected healing fracture**
5. **Skull fractures, especially if complex or bilateral**

Deye 2013: A small (~5%) but not insignificant number of infants < 12 months old with apparently isolated skull fracture undergoing abuse evaluation were found to have additional unexpected fractures on skeletal surveys.

Most acute fractures are symptomatic but there are some fractures (metaphyseal fractures and rib fractures) which are often occult and only identified on imaging and are highly concerning for child abuse. These fractures may be found "incidentally" when getting imaging for a different reason (ie, a rib fracture seen on a chest xray obtained in an infant with suspected pneumonia) but need to be addressed the same as any abusive injury.

6. Classical metaphyseal fractures (bucket handle fractures) from being shaken violently back and forth
7. Rib fractures, especially posterior rib fractures (highest probability for abuse)
Every injury can be caused by abuse. Nothing is pathognomonic for abuse.

Bonks
Signs of abusive head trauma can be subtle and non-specific. The Pittsburgh Infant Brain Injury Score (PIBIS) by Berger et al (see below) can help decide which patients warrant head imaging.
Skull fractures are most often accidental, but a small proportion are associated with abuse according to Deye et al in 2013. Increase your suspicion for abuse if skull fractures are complex, bilateral, depressed, open, presenting with suture diathesis or occipital fractures.

Burns

BURNS THAT ARE HIGHLY CONCERNING FOR ABUSE	
Highly Concerning Burns	**Comments**
Immersion scald burns (especially if symmetric, well-demarcated) - Stocking and/or glove distribution - Symmetrically burned buttocks/genitals (often related to punishment during potty training) **Contact burns** - Cigarette burns (especially if multiple and/or in protected locations) - Other well-demarcated patterned burns mirroring a hot object (e.g. clothing iron, cigarette lighter, curling iron, hair blow dryer, cooking items)	** Most accidental burns in children are scald burns due to spillage of hot liquids and are located on the anterior body surface, are asymmetric, and have obvious splash marks (but even these burns can be child abuse – e.g. adult is cooking, becomes angry, and throws a pan of boiling water on a child)* ** Most accidental contact burns occur when the hot object is touched or grasped (burning the palmar surface of the hand) or falls (causing multiple irregular burns as it falls).*

Bites

Human bites have typical, stereotyped pattern.

Baby Blues (Irritability)

Some severe injuries (see head trauma) can present with very non-specific symptoms. This is why it is so important to fully examine all concerning patients.

4) What is the ED management, and who requires reporting?

The unfortunate truth is, if we don't think about abuse, we'll definitely miss it. So, the most important first step is always simply to **think about it**. Then our responsibility turns to **reporting it**, **considering the differential diagnosis**, **investigating** what is medically necessary and **ensuring appropriate follow up or admission** if necessary.

Report abuse when you are suspicious – it is your legal responsibility. Regional guidelines vary, but report based on suspicion, not on proof.