Common Pitfalls in the Recognition and Diagnosis of Child Abuse: Missing the Tip of the Iceberg

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Disclosures

I have nothing to disclose.

Objectives

- Recognize sentinel injuries of child abuse
- Determine biases related to missing the diagnosis of abuse
- Analyze communication failures in child abuse cases

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Today's Presentation

- Missing the diagnosis of physical abuse
- NOT about mimics
- NOT about confusing accidental injuries

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Common Pitfalls in the Diagnosis of Physical Abuse

- Preconceived bias: information is perceived or interpreted differently due to bias.
- Fixation errors: information is ignored or not used due to a foregone conclusion.
- Knowledge errors: information is not known, and therefore, incorrect conclusions and diagnoses are made.

Pierce MC, Kaczor K, Lohr D, Richter K, Starling SP. A Practical Guide to Differentiating Abusive From Accidental Fractures: An Injury Plausibility Approach. *Clinical Pediatric Emergency Medicine*. 2012; 13(3): 166-177.

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Common Pitfalls in the Diagnosis of Physical Abuse

- Things are not what they appear to be.
- Pressure to give an interpretation causes a premature conclusion.
- Abuse is in the differential but not reported.
- Other communication failures.

Preconceived Bias

CASE:

A 17 year old mom brings her 2 month old son for evaluation because he is pale and has multiple episodes of vomiting. He has no bruises and you (the PMD) have been taking care of this patient since birth. It is winter and there are currently multiple children hospitalized due to a viral gastroenteritis. He is admitted to the hospital for evaluation, and although he is afebrile, his work-up includes blood, urine and CSF for culture. All tests and cultures are negative except for slight anemia. After three days of antibiotics, he is discharged home.

Preconceived Bias

One month later (age 3 months), he presents with a bulging fontanel, old and new subdural hemorrhages, and healing rib fractures.

Should we have considered abuse at the previous visit?

Missed Cases of Abuse

- Factors increasing risk of missing acute head trauma:
  - Younger age
  - "Intact" family
  - Caucasian
  - Asymptomatic
  - Misinterpretation of radiologic findings
- 20/54 missed cases revealed facial and/or scalp injuries at initial presentation.

Jenny C, Hymel KP, Ritzen A, Reinert SE, Hay TC. Analysis of missed cases of abusive head trauma. *JAMA*. 1999; 281(7):621-626.

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Missed Abuse

- Nearly 3/4 of victims have evidence of old injury when finally diagnosed with acute head trauma.
- 30-40% go unrecognized by medical providers at first presentation.

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Disparities in the Evaluation and Diagnosis Among Infants with Traumatic Brain Injury

- Publicly insured infants were more likely to have skeletal surveys performed than were privately insured infants (81% vs. 53%).
- This difference was even greater among Black and Hispanic infants compared to White infants.
- National data (from 39 pediatric hospitals) suggest continued biases in the evaluation for abusive head trauma.

Wood JN, Hall M, Schilling S, Keren R, Mitra N, Rubin DM. Disparities in the evaluation and diagnosis of abuse among infants with traumatic brain injury. *Pediatrics*. 2010 Sep; 126(3): 408-14. Epub 2010 Aug 16.

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Biases
Who does this?

In a chart review of 151 infants:

- 12.6% mothers
- 17.5% female babysitters
- 60% fathers, stepfathers and moms' boyfriends
  - 37% fathers
  - 20.5% boyfriends

Starling SP, Holden JR, Jenny C. Abusive head trauma: The relationship of perpetrators to their victims. *Pediatrics. 1995;* 95 (2): 259-262.

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Pitfalls and Biases
Who does this?

47.6% increased risk of death due to inflicted injury in infants residing in a household with unrelated adults compared to households with two biological parents.

Schnitzer PG, Ewigman BG. Child deaths resulting from inflicted injuries: Household risk factors and perpetrator characteristics. *Pediatrics.* 2005; 116:e687-e693

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Why was abuse missed in our case?

- Bias:
  - Physician knows the family
  - Unconscious denial by physician
- Fixation error:
  - Red flags ignored
  - Clues ignored because they did not fit with the "conclusion"

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Missed Facts

- Mother was drug user at birth of child.
- Father not involved, new boyfriend now living with mom.
- No fever.
- Bulging fontanel misinterpreted.

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Retinal Hemorrhages

- Retinal hemorrhages are a cardinal manifestation of abusive head trauma.
- May be a few, exclusively intra-retinal, confined to the posterior pole, or microscopic (seen at autopsy only).
- Asymmetry and unilaterality are well recognized.
- Traumatic retinoschisis may occur.

Alex Levin. Ophthalmic manifestations of inflicted childhood neurotrauma. *AAP Conference Proceedings*, 2002.

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Radius/Ulna Fractures

62% of radius/ulna fractures in children birth to 11 months of age are caused by abuse.

Leventhal JM, Martin KD, Agnes AG. Incidence of fractures attributable to abuse in young hospitalized children: Results from analysis of a United States database. *Pediatrics* 2008;122:599-604.

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Diagnostic Imaging Guidelines Highlights

TABLE 1 Complete Skeletal Survey Table[14]

Appendicular skeleton
Arms (AP)
Forearms (AP)
Hands (PA)
Thighs (AP)
Legs (AP)
Feet (PA or AP)
Axial skeleton
Thorax (AP and lateral), to include thoracic spine and ribs
AP abdomen, lumbosacral spine, and bony pelvis
Lumbar spine (lateral)
Cervical spine (AP and lateral)
Skull (frontal and lateral)

AP indicates anteroposterior; PA, posteroanterior.

Under two years do a skeletal survey (consider for 3 year olds)

- Missed acute fractures
- Bone scan limitations
- Add oblique ribs

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Pitfalls

Things are not what they appear to be…

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Common "Histories" in Head Trauma

- Unwitnessed event.
- Baby fell--a short fall.
- Sibling did it.

Hymel KP, Makoroff KL, Laskey AL, et al. Mechanisms, clinical presentations, injuries, and outcomes from inflicted versus noninflicted head trauma during infancy: Results of a prospective, multicentered, comparative study. *Pediatrics.* 2007; 119: 922-929.

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What are some (CNY) chief complaints?

- Stopped breathing
- Went limp
- Coughing, choking, went limp
- Seizure
- Vomiting
- Facial swelling
- Witnessed injury

Sentinel Injuries

- A visible minor injury in a pre-cruising infant that is poorly explained.
- A history of a sentinel injury should increase suspicion/level of concern for maltreatment.

Those who don't cruise…

- Bruises were rare in infants and pre-cruisers (more rare on face and trunk).
- Bruises in children less than 9 months should be evaluated.

Sugar N. Bruises in infants and toddlers. *Archives Of Pediatrics & Adolescent Medicine.* 1999 Apr; 153(4): 399-403.

Intra-Oral Injuries

- Intra-oral injuries occur in a significant number of children who have been physically abused.
- A torn frenum in isolation cannot be described as pathognomonic of physical abuse.
- Midline abnormalities may be mistaken for abuse (midline diastema).

Maguire S, Hunter B, Hunter L, Sibert JR, Mann M, Kemp AM. Diagnosing abuse: a systematic review of torn frenum and other intra-oral injuries. *Arch Dis Child.* 2007; 92: 1113-1117.

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How can we avoid missing sentinel injuries?

- Evaluate for abuse when there are facial bruises or frena tears (without a clear history) in pre-ambulatory children.
- Any bruise or fracture that is poorly explained may be a sentinel injury.
- Sentinel injuries are often observed by a parent.

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Delayed Identification of Fractures

- Approximately 20% of abusive fractures were missed at initial physician visits.
- In all of these cases, the signs/symptoms of the fracture were observed, but the possibility of abuse was not raised.
- Boys, children who present to a non-pediatric ED or a primary care setting, and/or those with an extremity fracture appeared to be at the greatest risk of missed abuse diagnosis.
- A detailed review of the mechanism of trauma and screening for risk factors for abuse should occur with the evaluation of any young child with a fracture.

Ravichandiran N, Schuh S, Bejuk M, Al-Harthy N, Shouldice M, Au H, Boutis K. Delayed identification of pediatric abuse-related fractures. *Pediatrics*. 2010 Jan;125(1): 60-6. Epub 2009 Nov 30.

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Most Common Abusive Fractures

Specificity of Radiologic Findings
High specificity
Classic metaphyseal lesions
Rib fractures, especially posterior
Scapular fractures
Spinous process fractures
Sternal fractures
Moderate specificity
Multiple fractures, especially bilateral
Fractures of different ages
Epiphyseal separations
Vertebral body fractures and subluxations
Digital fractures
Complex skull fractures
Common but low specificity
Subperiosteal new bone formation
Clavicular fractures
Long bone shaft fractures
Linear skull fractures
Highest specificity applies in infants.

The most common fractures in abused children involve the skull, long bones and ribs. The numbers vary (relatively) depending on the series studied (detail of radiologic imaging), age of the children and whether the studied populations included fatalities.

Kleinman PK. Diagnostic imaging in infant abuse. *AJR Am J Roentgenol*. 1990 Oct;155(4):703-12. Review.

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The Absence of Bruising

- In the Peters study of 192 children (6 weeks to 120 months) with inflicted fractures (626 fractures) no bruising was found in 57.8% of the study participants.
- 20.8% had bruising near the site of at least one fracture.
- Of these, 43. 3% were skull fractures with bruising or associated subgaleal hematomas.
- The presence of bruising near the site of an extremity or rib fracture was an uncommon finding.

Peters ML, Starling SP, Barnes-Eley ML, Heisler KW. The presence of bruising associated with fractures. *Arch Pediatr Adolesc Med.* 2008 Sep;162(9):877-81.

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Communication Failures

- "Impact" Statements
- Documentation in records

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Writing Your Opinion in a Statement

- A report or letter may be written by a health care provider about a child or children suspected of having been abused.
- Intended to inform future medical care for the child and legal decisions related to the case, including court proceedings.
- May be called by names, such as an impact statement.
- Some use the medical record or report with a separate section for the final statement.

Mian M, Schryer CF, Spafford MM, Joosten J, Lingard L. Current practice in physical child abuse forensic reports: A preliminary exploration. *Child Abuse & Neglect.* 2009. 33: 679-683.

Documentation Tips

- Avoid jargon.
- Create a written chronology of information.
- Describe injury by stating facts and estimate degree of force.
- Avoid assignment of "intent."
- Differentiate natural disease states.
- Differentiate accidental and non-accidental.
- Admit uncertainty.
- Consider pointing out limitations of the report.

David TJ. Avoidable pitfalls when writing medical reports for court proceedings in cases of suspected child abuse. *Arch Dis Child*. 2004 Sep; 89(9):799-804.

Pitfalls

Things are not what they appear to be:
Intended fabrication

Identification of Medical Abuse

- Are the history, signs, and symptoms of disease credible?
- Is the child receiving unnecessary and harmful or potentially harmful medical care?
- If so, who is instigating the evaluations and treatment?

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AAP Guidelines

Beyond Munchausen Syndrome by Proxy: Identification and Treatment of Child Abuse in a Medical Setting

- Make sure the child is safe.
- Make sure the child's future safety is also assured.
- Allow treatment to occur in the least restrictive setting possible.

Medical Abuse (Stirling, 2007)
http://aappolicy.aappublications.org/cgi/reprint/pediatrics;119/5/1026.pdf

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Decisions to Report

Guided by:

- injury circumstances and history
- knowledge of and experiences with the family
- consultation with others
- previous experiences with child protective services

Jones R, Flaherty EG, Binns HJ, et al. Clinicians' description of factors influencing their reporting of suspected child abuse: Report of the Child Abuse Reporting Experience Study Research Group. *Pediatrics*. 2008 Aug; 122(2):259-66.

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Physicians Don't Always Report

- 327 clinicians indicating some suspicion of child abuse for 1683 injuries were analyzed.
- Clinicians reported 95 (6%) of the 1683 patients to child protective services.

Flaherty EG, Sege RD, Griffith J, et al & PROS network; NMAPedsNet. From suspicion of physical child abuse to reporting: Primary care clinician decision-making. *Pediatrics*. 2008 Sep; 122(3):611-9. Epub 2008 Aug.

Physician Reporting

- Clinicians did not report 27% of injuries considered likely or very likely caused by child abuse and 76% of injuries considered possibly caused by child abuse**.**
- Reporting rates were increased if the clinician perceived the injury to be inconsistent with the history and if the patient was referred to the clinician for suspected abuse.

Flaherty EG, Sege RD, Griffith J, et al & PROS network; NMAPedsNet. From suspicion of physical child abuse to reporting: Primary care clinician decision-making. *Pediatrics*. 2008 Sep; 122(3):611-9. Epub 2008 Aug.

Why not reported?

- Denial — belief in the parent
- Diagnosis — training
- Missed radiographic finding
- Pattern of abuse not understood — ie, sentinel injuries
- Bad experiences with CPS
- Plan to "follow-up"

Pressure to Respond

"This patient has bruises which could represent the kind of bruises seen in an active child who has fallen down. However, given the report given to Child Protective Services we have elected to obtain the following studies: Pending at this time include a skeletal survey, CBC, differential and platelets, also studies to rule out von Willebrand disease."

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Pitfalls

When pressured to respond to the investigation, it's OK to say, "I'm not able to interpret the findings."or "I do not have all the results back yet."

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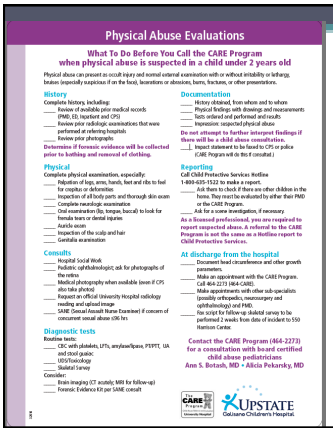

Physical Abuse Evaluations

What To Do Before You Call the CARE Program when physical abuse is suspected in a child under 2 years old

Physical abuse can present as occult injury and normal external examination with or without irritability or lethargy, bruises (especially suspicious if on the face), lacerations or abrasions, burns, fractures, or other presentations.

History

Complete history, including:
___ Review of available prior medical records (PMD, ED, inpatient and CPS)
___ Review prior radiologic examinations that were performed at referring hospitals
___ Review prior photographs

Determine if forensic evidence will be collected prior to bathing and removal of clothing.

Physical

Complete physical examination, especially:
___ Palpation of legs, arms, hands, feet and ribs to feel for crepitus or deformities
___ Inspection of all body parts and thorough skin exam
___ Complete neurologic examination
___ Oral examination (lip, tongue, buccal) to look for frenula tears or dental injuries
___ Auricle exam
___ Inspection of the scalp and hair
___ Genitalia examination

Consults

___ Hospital Social Work
___ Pediatric ophthalmologist; ask for photographs of the retina
___ Medical photography when available (even if CPS also take photos)
___ Request an official University Hospital radiology reading and upload image
___ SANE (Sexual Assault Nurse Examiner) if concern of concurrent sexual abuse ≤96 hrs

Diagnostic tests

Routine tests:
___ CBC with platelets, LFTs, amylase/lipase, PTT/PT, UA and stool guaiac
___ UDS/Toxicology
___ Skeletal Survey

Consider:
___ Brain imaging (CT acutely; MRI for follow-up)
___ Forensic Evidence Kit per SANE consult

Documentation

___ History obtained, from whom and to whom
___ Physical findings with drawings and measurements
___ Tests ordered and performed and results
___ Impression: suspected physical abuse

Do not attempt to further interpret findings if there will be a child abuse consultation.

___ Impact statement to be faxed to CPS or police (CARE Program will do this if consulted.)

Reporting

Call Child Protective Services Hotline 1-800-635-1522 to make a report.
___ Ask them to check if there are other children in the home. They must be evaluated by either their PMD or the CARE Program.
___ Ask for a scene investigation, if necessary.

As a licensed professional, you are required to report suspected abuse. A referral to the CARE Program is not the same as a Hotline report to Child Protective Services.

At discharge from the hospital

___ Document head circumference and other growth parameters.
___ Make an appointment with the CARE Program. Call 464-2273 (464-CARE).
___ Make appointments with other sub-specialists (possibly orthopedics, neurosurgery and ophthalmology) and PMD.
___ Fax script for follow-up skeletal survey to be performed 2 weeks from date of incident to 550 Harrison Center.

Contact the CARE Program (464-2273) for a consultation with board certified child abuse pediatricians
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CARE Program

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Steps

- Request a scene investigation.
- Examine siblings.
- Consider forensic evidence collection.
- Repeat skeletal survey in 2 weeks.

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Pitfall
Pressure to Respond

- Use caution about making inferences on the specific timing, pattern or cause of brain injury from a single non-contrast CT scan or MRI.
- Request a scene investigation.
- Wait for all tests, including follow up skeletal survey before "final" opinion.
- Request a consult from a child abuse pediatrician.

AAP Guidelines

- Evaluation of Suspected Child Physical Abuse (Kellogg, 2007)
- Evaluating Infants and Young Children with Multiple Fractures (Jenny, 2006)
- Diagnostic Imaging in Abuse (Section on Radiology, 2009)
- Beyond Munchausen Syndrome by Proxy (Stirling, 2007)

Summary

Recognize sentinel injuries of child abuse.

- Those that don't cruise rarely bruise
- Frenula tears
- Fractures mistaken for accidental

Summary

Determine biases related to missing the diagnosis of abuse.

- Preconceived bias: information is perceived or interpreted differently due to bias.
- Fixation errors: information is ignored or not used due to a foregone conclusion.
- Knowledge errors: information is not known, and therefore, incorrect conclusions and diagnoses are made.

Summary

Analyze communication failures in child abuse cases.

- Things are not what they appear to be.
- Pressure to give an interpretation causes a premature conclusion.
- Abuse is in the differential but not reported.
- Other communication failures.