Child Abuse: The Silent Epidemic

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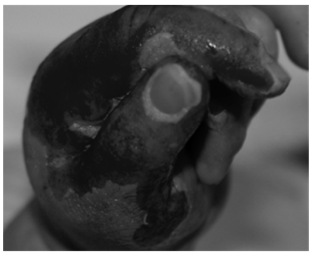
Objectives

- Identify patients who are at increased risk for child abuse
- Integrate strategies to combat implicit bias in child abuse
- Integrate knowledge of child abuse trauma into a usable screening practice

Case Study 1

- 18 month old male
- ED visit for burn to left hand
- Partial thickness burns on digits
- Mom reports that injury occurred under the care of "father"
- Father reports that injury occurred when he was vacuuming – "accidentally" vacuumed child's hand causing injury

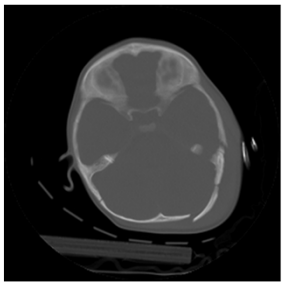
Case Study 1



Case Study 2

- 6 month old infant
- Parents called 911 after infant fell from changing table during diaper change
- Swelling noted on occiput
- Decreased neurologic status, required intubation
- No other injuries identified on exam
- Father is an anesthesiologist at the hospital

Case 2



Medical Decision Making

- Which of these 2 cases:
- Needs a social work consult?
- Needs a referral to the "Child Abuse Team?"
- Needs a skeletal survey?
- Is likely child abuse?

Which of these mechanisms is the leading killer of children?

- Pedestrian trauma
- Overlay (asphyxiation)
- Motor vehicle crash
- Drowning
- Child Abuse

Which of these mechanisms is the leading killer of children?

- **Trauma deaths by mechanism 2005-2014 (10 years)**
- **Child abuse = 58**
- **Motor vehicle crash = 37**
- **Drowning = 28**
- **Overlay = 27**
- **Pedestrian = 17**

95% of child abuse deaths are < 5 years old

Age	ASSAULT	MVC	DROWN	OVERLAY	PED
< 2	**44**	12	16	**27**	4
2-4	**12**	4	8	0	3
5-9	**2**	11	3	0	6
10-12	**0**	3	0	0	0
13-15	***1**	5	1	0	3
>15	**0**	2	0	0	1
AVERAGE AGE	**1.7**	6.6	3.13	0.24	6.68

*** = altercation, not child abuse**

Child Abuse: definition

- **Injury inflicted to a child by an adult caregiver:**
- **Injury can be mental or physical**
- **Physical injury can be from trauma (thermal, blunt, or penetrating tissue injury from kinetic energy) or rare non-trauma mechanisms**
- **Caregiver can be parent, relative, or non-related adult**
- **Synonyms: *non-accidental trauma*, *child maltreatment***
- ***Neglect (failure to meet basic needs) is also abuse***
- **This lecture is about physical injury from trauma**

Child Abuse: the numbers (USA)

- **3,600,000 reports of possible abuse in 2014**
- **702,000 were determined to be victims of abuse or neglect**
- **119,517 were the victims of physical abuse**
- **1580 children died as a result of abuse or neglect in 2014**
- **(compare to 760 MVC deaths and 604 pedestrian deaths age < 18 in 2014)**

Child Abuse is difficult to diagnose…

Child Abuse can mimic:

- **Coagulopathy ("easy bruising")**
- **Metabolic disease ("bone disease" causing fractures)**
- **CNS disorders (seizures)**
- **Dermatologic disease ("skin rashes")**
- **Infection (sepsis due to bowel perforation)**
- ***…and almost every patient is too young to give a history***
- ***…and parents will "ED shop" with an injured child to avoid detection***

History and Injury often do not match

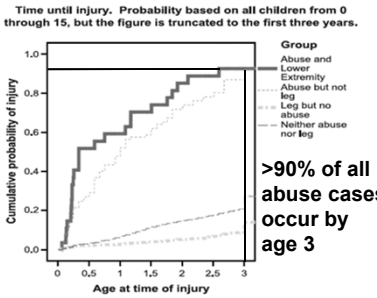
Risk of abuse in infants and toddlers with lower extremity trauma (study)

- **5 year review of 5500 admitted trauma patients at a single pediatric trauma center for *any* injury:**
- **Among children ≥ 18 months, 2% were abused**
- **Among children < 18 months, 32% were abused**

Risk of abuse in infants and toddlers with lower extremity trauma

- **Among children < 18 months with any lower extremity injury, 66% were abused**
- **Among children < 18 months with a lower extremity fracture, 74% were abused**

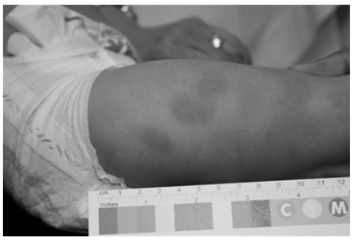
J Pediatr Surg. 2005 Jan;40(1):120-3.



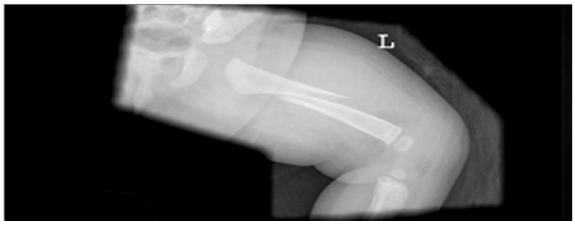
>90% of all abuse cases occur by age 3

J Pediatr Surg. 2005 Jan;40(1):120-3.

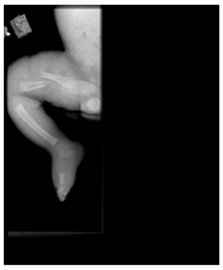
Lower extremity soft tissue injury



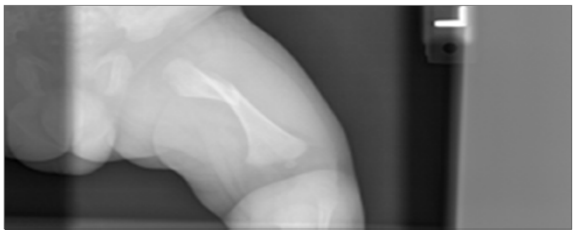
4 month old with femur fracture



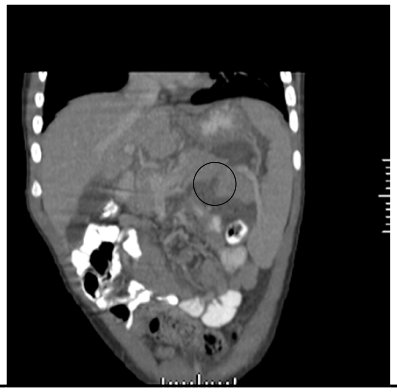
2 month old with femur fracture



1 month old with femur fracture



Pancreatic Injury in a toddler



Medically Fragile Children: Higher Risk?

- NICU grads vs. "well babies:" a sibling comparison
- Infants from a Level IV NICU were compared to non-NICU siblings
- Statistical modeling to control for confounding variables
- Risk of child abuse was particularly high during the first year of a NICU infant's life
- Risk of child abuse was also high for infants in families with other abuse risk factors

•Risch EC, Owora A, Nandyal R, Chaffin M, Bonner BL. Child Maltreat. 2014 Jun 11;19(2):92-100

Medically Fragile Children: Higher Risk?

- Caregiving burden is significant for some NICU graduates (g-tubes, feeding pumps, supplemental oxygen, monitors, etc.)
- Caregiving burden was associated primarily with an increased risk of child welfare reporting during the first few months to first year of life, after which risk was similar to NICU graduates without caregiving burden
- Caregiving burden effects were potentiated by having three or more siblings in the family

Medically Fragile Children: Higher Risk?

- A history of prior child welfare reports predicted very high risk, regardless of caregiving burden.
- Young maternal age increased risk.
- Caregiving burden may increase the risk of child abuse in infants who are NICU graduates.

- Risch EC, Owora A, Nandyal R, Chaffin M, Bonner BL.
- Child Abuse Negl. 2013 Dec;37(12):1114-21

Medically Fragile Children: Higher Risk?

•Why are NICU graduates at higher risk (personal opinion)?

•Multiple care givers in NICU, only 1 or two at home

•NICU environment prevents development of normal sleep/wakefulness cycles

•Monitors and equipment can be frustrating at home (oxygen, monitors, feeding pumps)

•Fear/anxiety of taking care of a small infant at home

•Narcotic withdrawal in surgical infants may increase fussiness

Chronic subdural hematomas in former premature infant due to child abuse

Factitious disorder by proxy

- persistent illness in a child that cannot be explained on a medical basis
- symptoms improve when child is removed from caregivers
- Long delay from onset of symptoms to diagnosis
- Mothers are most often perpetrator
- mothers often have history of abuse or Munchausen symptoms (66%)
- Medical training is common among perpetrators (55% worked in or studied health care)

Factitious disorder by proxy

- Often presents as a bizarre medical illness:
  - Renal failure in a healthy child (parents contaminated blood samples with urine)
  - Severe GERD refractory to anti-reflux procedures (parent faked vomiting)
  - "familial" SIDS (multiple homicides by parents)
- May occasionally present as a trauma:
  - Pharyngeal injury (parents blamed radiology)
  - Rectal trauma causing GI bleeding
  - Head trauma causing hearing loss or seizures

Factitious disorder by proxy

Summary:

- Bizarre injuries that can't be explained
- Bizarre illnesses that can't be explained
- Prolonged hospitalizations common
- Parents work in health care or are very knowledgeable about health care
- Parents sometimes break social norms ("hang out" at nurses station, "move in" to patient's room)

Child abuse and traumatic brain injury

- Child abuse should be in the "top tier" of the differential diagnosis for any infant who is brought to the ED in a comatose state from home
- Child abuse must also be considered in an otherwise healthy infant with new onset seizures

ED screening for child abuse: WHO SCREENS?

- Survey of 72 children's hospitals in USA
- All hospitals had a specific individual or team that specializes in child abuse pediatrics
- Only 13% of hospitals reported that a standardized screening tool was deployed to detect child abuse

- Pediatr Surg Int. 2016 Aug;32(8):815-8.
- A national survey on the use of screening tools to detect physical child abuse.
- Crichton KG, Cooper JN, Minneci PC Groner JI, Thackeray J, Deans KJ

WHY SCREEN?

1. Reduce implicit bias
2. Earlier detection

Implicit Bias (definition)

- When a health care provider's decision making is impacted by the patient's:
  - Race
  - Socioeconomic status
  - Other demographic factors (citizenship, religion, etc.)

Implicit Bias

- Multiple studies indicate that healthcare professionals exhibit the same levels of implicit bias as the wider population
- Some studies show that this implicit bias can impact clinical decision making
- Other studies suggest that patient care is not impacted.

Are decisions to evaluate for abuse are subject to bias?

- Retrospective study of 173 children with abusive head trauma (AHT)
- 54 (31%) were seen after injury but diagnosis was missed
- AHT was more likely to be missed in very young white children with intact families
- AHT also likely to be missed in children without respiratory compromise or seizures

JAMA. 1999 Feb 17;281(7):621-6.
Analysis of missed cases of abusive head trauma.
Jenny C1, Hymel KP, Ritzen A, Reinert SE, Hay TC.

Implicit Bias in child abuse

- White children from intact families were less likely to be evaluated for possible child abuse
- This means that white children are potentially at greater risk for abuse related injury or death compared to than their non-white counterparts.

Early Detection Saves Lives…

•…Because mortality risk increases as abuse-related injury episodes increase

Recurrent episodes of NAT in children

- Data source: Ohio State Trauma Registry
- Patients with a single episode of NAT and recurrent episodes of NAT ("rNAT") were identified by matching date of birth, race, and sex between records of patients younger than 16 years between 2000 and 2010
- A total of 1,572 patients of NAT were identified, with 53 patients meeting criteria for rNAT

Recurrent episodes of NAT in children

- Compared with patients with single-episode NAT, patients with rNAT were:
  - more commonly male (66% vs. 52%, p = 0.05)
  - were white (83% vs. 65%, p = 0.02)
  - were more likely to be evaluated at a pediatric trauma center (87% vs. 69%, p = 0.008)
  - had higher mortality (24.5% vs. 9.9%, p = 0.002).

Recurrent episodes of NAT in children

- Compared with rNAT patients who did not die, those who died with rNAT had:
  - a longer interval from initial episode to second episode
  - were older during their second episode
- At initial presentation, lower-extremity fractures (p = 0.09) and liver injuries (p = 0.06) were reported more commonly in nonsurvivors of rNAT.

Recurrent episodes of NAT in children

- Mortality is significantly higher in children who experience rNAT.
- it is critically important to effectively intervene with appropriate resources and follow-up after a child's initial episode of NAT to prevent a future catastrophic episode

- J Trauma Acute Care Surg. 2013 Jul;75(1):161-5.
- Mortality increases with recurrent episodes of nonaccidental trauma in children.
- Deans KJ1, Thackeray J, Askegard-Giesmann JR, Earley E, Groner JI, Minneci PC.

How do you screen for abuse?

- National survey of 72 children's hospitals
- 9 respondents reported using a standardized tool
- 5 respondents provided the length of the tool
  - 2 tools were 1 question only
  - 1 tool was three questions
  - 1 tool was twelve questions
  - 1 tool was fifteen questions

Pediatr Surg Int. 2016 Aug;32(8):815-8

What are the barriers to screening?

Table 3 Perceived barriers to implementation of a standardized tool to screen for child physical abuse

	N (%)
Lack of time for development of a screening policy	15 (24)
Do not feel such a tool is necessary	12 (19)
Lack of time for completion of a screening tool	9 (15)
Lack of support from managers and/or hospital board	5 (8)
Lack of understanding and/or awareness of child abuse	3 (5)
Lack of community resources	2 (3)
Difficulty of communicating with parents/caregivers in the case of suspected abuse	1 (2)
No child abuse pediatrician or team available	0 (0)
Other	37 (60)

What are the barriers to screening?

Respondents were given the opportunity to describe additional barriers to implementation of a tool for screening for child physical abuse. The most common barrier (38 %, $n = 14$) noted was lack of a validated, effective screening technique for abuse.

How do you screen in a busy ED?

- **"We can't screen every child who walks through the doors of the ED."**
- **Our ED/urgent care (main campus) handles about 80,000 visits per year.**
- **How do we pick the patients who are at highest risk?**

Recommendations for screening

- **Develop a tool that:**
- **Is easy to use**
- **Appears automatically in the chart when a child needs to be screened**
- **Does not require any extra time for ED team**
- **Screens without bias due to race, ethnicity, or family location**

How we do it…

Our child abuse screen seeks two pieces of information:

1.Is the child < 5 years old? (EHR can determine this)

***2. Was the child injured inside a home?* (answered by physician)**

•If "yes," then an automatic notification is sent to the child abuse team

•The abuse team will review the chart and decide if a face to face visit is required

Does it work?

	Pre-Screening Tool	Post-Screening Tool
	N (%)	N (%)
Abuse	101 (47.6%)	155 (26.7%)**
Accidental	65 (30.7%)	347 (59.8%)**
Indeterminate	11 (5.2%)	25 (4.3%)
Neglect	19 (9.0%)	29 (5.0%)
Medical Cause	12 (5.7%)	12 (2.1%)
No injury	4 (1.9%)	12 (2.1%)
** denotes p<0.01		

Does it work?

	Pre-Screening Tool	Post-Screening Tool
	N (%)	N (%)
Reported to CPS	166 (78.2%)	272 (47%)
Not reported to CPS	46 (21.7%)	308 (53%)**
** denotes p<0.01		

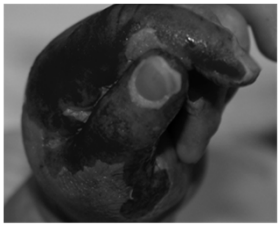
A standard screening protocol

- **Will decrease implicit bias**
- **Will increase the overall pool of potential child abuse victims**
- **But will identify many more children with child abuse**
- **In other words:**
  - **More work for your team**
  - **More cases detected**
  - **More lives saved**

Case Study 1

- 18 month old male
- Presents to emergency department with burn to left hand
- Partial thickness burns on digits
- Mom reports that injury occurred under the care of "father"
- Father reports that injury occurred when he was vacuuming – "accidentally" vacuumed child's hand causing injury
- Father is an anesthesiologist at the hospital

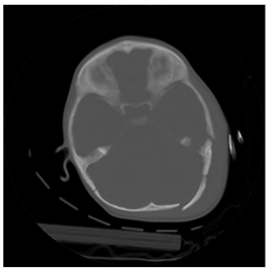
Case Study 1



Case Study 2

- 6 month old infant
- Parents call 911 after infant fell from changing table
- Swelling noted on occiput
- Decreased neurologic status, required intubation
- No other injuries identified on exam
- Parents live in affluent suburb

Case Study 2



Case study 3

- 22 month old toddler
- Mom reports that toddler was taking a bath, older child also in tub, accidentally turned hot water on toddler's hands
- She immediately applied cold towels and brought child to emergency department

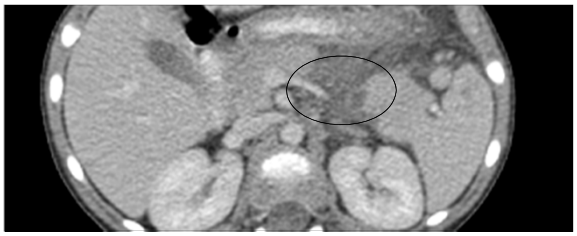
Case Study 3: Does this child need screening?

Case Study 4

- 4 year old female
- Brought to ED for abdominal pain, anorexia, vomiting
- History and exam suggests possible appendicitis
- Ultrasound of the abdomen reveals normal appendix but ascites
- CT scan of the abdomen obtained

Case Study 4: Any concerns for abuse?

Any concerns for abuse?



Conclusions

- Child abuse is a unique disease in that the caregivers do NOT want you to detect it
- Child abuse can be difficult to detect in the ED:
  - Injuries may be subtle or confusing
  - Child may visit several different emergency rooms
  - Story may be inconsistent
  - History may not be compatible with injuries
  - Most victims are too young to give a history

Conclusions

- Child Abuse is a leading cause of trauma deaths
  - Kills more children than motor vehicle crashes
- A simple screening tool can reduce bias, improving detection of child abuse cases
- A simple screening process can result in earlier detection of child abuse cases
- Screening has the potential to prevent harm and save lives

References

- 1: Crichton KG, Cooper JN, Minneci PC, Groner JI, Thackeray JD, Deans KJ. A
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