Case Example

- 26 day old hospitalized for a presumed infection of the upper labial frenulum
- Hospitalized for 3 days and received ID and ENT consultations
- Discharged home

Case Example

- Returns to hospital at 40 days of age
- Spent majority of previous day with mother with no identified concerns
- Two hours after father assumes care of child, infant develops difficulty feeding with progressive lethargy
- Approximately 15 hours after initial symptoms, infant presents to emergency department with seizures

Initial Examination
**Head Imaging**

- Three children removed from the parents’ care in the past for neglect
- History of IPV involving the mother and multiple past partners
- Both parents with a history of arrest for theft
- This child’s 5-month old stepsibling was evaluated for a transverse fracture of her distal tibia two months before this child’s presentation, but no report of suspected physical abuse was made

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**What is child maltreatment?**

- Common types of maltreatment include:
  - Neglect
  - Physical Abuse
  - Sexual Abuse

---

**20-20 Hindsight History**

- CPS agencies received 3.4 million referrals
- An estimated 680,000 children were determined to be victims of child abuse or neglect
- 9.1 per 1000 children
- This is the tip of the iceberg - *many* cases are never reported

---

**2011 National Statistics**

- Data obtained from U.S. Department of Health and Human Services
### Risk Factors for Child Abuse

- **A child who...**
  - Is young
    - Highest rate of maltreatment for children between birth and 3 years of age
  - Why?
    - Small physical size
    - Early developmental status
    - Need for constant care
    - Has a "difficult" temperament
    - Was unwanted or unplanned
    - Has a disability or chronic illness

- **A parent who...**
  - Is young
  - Has a history of substance abuse
  - Has mental illness
  - Has poor coping abilities
  - Has unreasonable expectations for the child
  - Has been abused him/herself

- **A family with...**
  - Intimate partner violence
  - Poverty
    - 22-25 times more likely to experience maltreatment
    - 16 times more likely to be a victim of physical abuse
    - 18 times more likely to be sexually abused
    - 44 times more likely to be neglected
    - 56 times more likely to be educationally neglected
  - Social Isolation

- **A family with...**
  - A single parent
    - 120% greater risk of being endangered by some type of child abuse or neglect
    - 220% greater risk of educational neglect
  - An unrelated adult in the home
  - Multiple children
    - 2-3 children: 2.5-3 times more likely to be neglected
  - Stressors (Work, $$)

---

Data taken from Third National Incidence Study on Child Abuse and Neglect, 2001
### Risk Factors for Child Abuse

- A community with...
  - Poverty
  - Crime
  - Violence
  - Substance abuse
  - Social isolation
  - Lack of support systems

### Child Abuse: Who is at risk?

- Any child at any age
- Any parent or caretaker can abuse a child
- Avoid the “not in my neighborhood” trap!
- Abuse is seen in:
  - All cultures
  - All ethnicities
  - All races
  - All socioeconomic groups

### Child Abuse – Why We Care

- It is self-protective:
  - We are potentially legally liable for missing abuse and definitely liable for identifying it and not acting upon it
- It is good medical care:
  - Timely identification of child abuse is critical to preventing additional harm, including death

### Missed Abuse

- Jenny 1999:
  - Reported 54 cases of abusive head injury missed upon the first hospital presentation
  - 28% of these children were re-injured after the missed diagnosis
  - 40% of these children experienced medical complications related to the missed diagnosis
  - At least four children died from what would have been preventable deaths
Increasing Morbidity/Mortality

- Schmitt et al 1990
  - Studied abused children who were returned to the home in which the abuse occurred without any specific intervention or safety plan
  - Found those children had increased risk of recurrent abuse by 35-50% and a higher risk of a fatal recurrent episode by 5-10%

- Putnam-Hornstein 2011
  - Prospective population-based study of mortality following a nonfatal allegation of maltreatment
  - Followed over 4 million children in California
  - Children with a prior allegation of maltreatment:
    - Died from intentional injuries at a rate that was 5.9 times greater than unreported children (95% CI [4.39, 7.81])
    - Died from unintentional injuries at twice the rate of unreported children (95% CI [1.71, 2.36])

Ohio Trauma Registry Data

<table>
<thead>
<tr>
<th></th>
<th>Single episode (n=1510)</th>
<th>Recurrent episode (n=51)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>67% (102/1510)</td>
<td>63% (33/51)</td>
<td>0.62</td>
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<td>Female</td>
<td>33% (49/1510)</td>
<td>37% (18/51)</td>
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<td>4% (2/51)</td>
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<td>87% (46/51)</td>
<td>0.008</td>
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<td>24.5% (13/51)</td>
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Ohio Trauma Registry Data

Comparison of Victims of a Single Episode of Child Abuse to Victims of Recurrent Episodes of Child Abuse

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Potential Strategies

- Case reviews
- Root cause analyses
- Education to “high-risk” providers:
  - ED/Urgent care providers
  - Ambulatory pediatricians
  - Dental/ENT specialists

Acknowledging Bias

- Disparities exist in assessing for child abuse:
  - Jenny et al (1999): AHT missed more often in white children
  - Lane et al (2002): Minority children had higher rates of evaluation for abuse and reports for suspected abuse
  - Physical abuse considered more often in children with low SES (Lane et al, 2007 & Laskey et al, 2012)

Physical Abuse Consult Tool

- Retrospective chart review with prospective implementation of the Physical Abuse Consult Tool
- Comparison of consults from year before introduction of tool (n=212) to consults from year after introduction of tool (n=302)

Physical Abuse Consult Tool

- Have you started a child abuse evaluation in the ED?
- Is the child being admitted for an injury?
- Is the injury a burn, near-drowning, or isolated forearm/elbow fracture?
- Did the injury occur inside the home?
Physical Abuse Consult Tool

- Child Assessment Team consulted on any admitted child less than 5 years of age who sustains an injury in a residence

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<table>
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<tbody>
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<td><strong>Table:</strong></td>
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<table>
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<tr>
<th></th>
<th>Pre-Tool</th>
<th>Post-Tool</th>
<th>Not significant</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>Median: 0.75y (4d – 4y 11m)</td>
<td>Median: 1.08y (5d – 4y 10m)</td>
<td>Not significant</td>
</tr>
<tr>
<td><strong>Insurance</strong></td>
<td>Commercial: 18% Public: 79% Self-pay: 2%</td>
<td>Commercial: 20% Public: 74% Self-pay: 6%</td>
<td>Not significant</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td>White: 67%</td>
<td>White: 75%</td>
<td>X²=3.99 p&lt;0.05**</td>
</tr>
</tbody>
</table>

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Standardizing the Approach

- Recommended workup for *any infant* with a sentinel injury:
  - Full physical examination
  - Head CT (<6 months or head/neck injury)
  - Skeletal survey
  - AST/ALT/Lipase
  - Psychosocial assessment

---

Case Example

- 7-week old twins – each with an isolated bruise on examination during a well-child visit

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TWIN A  TWIN B
8 week old, former 27 week EGA seen in BPD clinic for follow-up
• Noted to have bruising to the left cheek
• Mother states child often sleeps on his pacifier and believes this is the cause of bruising
• No psychosocial concerns identified

Child presents to ED 3 weeks later with irregular respirations, poor perfusion and seizure activity
• Child in the care of her father throughout the day – reports she awoke from nap “screaming” earlier in the day
• Found by grandmother
Conclusion

- Child abuse is common
- Although the risk for serious physical abuse is highest in children less than three years of age, any child is at risk
- Strategies should be implemented to avoid bias and standardize the workup for children with suspected abuse

Child Abuse

Jonathan I. Groner, MD
Clinical Professor of Surgery
Department of Surgery
Division of Pediatric Surgery
The Ohio State University Wexner Medical Center

Child Abuse – A surgeon’s perspective

- Child abuse is among the top killers of injured children
- Child abuse is the number one cause of homicide of young children
- In one study of pediatric homicide, 97% of the cases, the assailant was known to the victim and was a family relative in 77%.
Child Abuse – Diagnosis

Child Abuse can mimic:

- coagulopathy
- Metabolic disease
- CNS disorders
- Dermatologic disease
- Infection

12 week old with seizures
Diagnosis – History

- Injury occurred several days before ED visit
- Injury mechanism is vague or changes when history is retold
- Injury mechanism exceeds child's developmental abilities
- Injury far more severe than stated mechanism

“He fell off the couch.”

Physical Examination

- Injuries of different ages
- Injuries that are more severe than possible with the stated history
- Injury blamed on too-young sibling
- Injuries in unusual locations (cheeks, buttocks, genitalia)

Skin and soft tissue injuries

- Lip and labial frenulum lacerations in infants are highly suspicious for abuse
- Fresh bruises as well as resolving lesions
- Patterned marks on skin: light cord, belt, belt buckle, fingerprints
<table>
<thead>
<tr>
<th>Bruises of different ages</th>
<th>Marks from looped cord</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bruises on ear - unlikely to be unintentional</td>
<td></td>
</tr>
</tbody>
</table>

**Retinal Hemorrhages**

Are virtually pathognomonic of child abuse

**Burns**

- Common form of abuse
- Contact burns are common: cigarettes, irons, radiators
- Immersion burns: "stocking pattern" on feet combined with burn on buttocks, no splash marks
Visceral Injuries

- 10-15% of children hospitalized for abuse have an abdominal or thoracic injury
- Abdominal bruising may or may not be present
- May mask as medical illness (meningitis, ruptured appendix, anemia)
- History is almost always obscure or unrealistic (such as a simple fall)

Visceral Injuries

- Most common mechanism is thought to be compression of viscera against spine by a well-localized compressive force (such as a fist striking the mid-abdomen)
- deliberate thoracic trauma may cause pulmonary contusion or mediastinal emphysema.

Visceral Injuries

- Solid organ injuries
- Intestinal perforation
- Duodenal hematoma
- Pancreatic trauma
- Mesenteric tears
- Rectal injuries
Musculoskeletal trauma

- Fractures occur in 25% of children who suffer from physical abuse
- Fractures are caused by pulling or twisting, not falls
- Multiple fractures at various stages of healing is almost diagnostic
- Metabolic bone disorders must be excluded

Musculoskeletal trauma

- Epiphyseal separations
- Metaphyseal fractures
- “bucket handle fracture” - epiphyseal-metaphyseal separation (virtually pathognomonic of abuse)
- Diaphyseal spiral fracture attributed to fall is highly suspicious for abuse
Fractures

- Order of frequency: humerus, femur, tibia, forearm bones, clavicle, facial bones, ribs
- Most fractures due to child abuse occur before age 3
- Any significant leg injury in a child less than 18 months old should be regarded as suspicious for intentional injury
Musculoskeletal trauma

- Patients > 18 months with lower extremity injuries: 1% were due to abuse
- Patients < 18 months with lower extremity injuries: 66% were due to abuse
- Patients < 18 months with lower extremity fractures: 75% were due to abuse
- The population sample was children admitted for treatment of injury
Head Trauma

- Third most common manifestation of child abuse
- Main cause of mortality due to child abuse
- A child with abusive head trauma may be comatose upon presentation with few signs of external injury
- Up to 30% of abusive head injuries can be missed by health care workers

Skull Fracture with soft tissue swelling in a 2 month old

Comminuted Skull Fracture in a 15 month old infant
Munchausen By Proxy

- Also called factitious disorder by proxy
- Persistent illness that cannot be explained on a medical basis
- Symptoms improve when child is removed from caregivers

Munchausen By Proxy

- 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)

Munchausen By Proxy

- Can even occur in the Pediatric ICU (example: intentional extubation of patient)
- Diagnosis may require covert video surveillance (in one study, made diagnosis in 50%)
- Can frequently affect more than one child in the family
Central venous catheters

- 17% of MBP patients had CVLS
- >50% of MBP CVL patients had line sepsis
- 2 CVL related homicides
- 1.1% of CVLs placed at one institution were discovered to have MSBP
- surgeons should not become unwitting collaborators!

Summary

- Child abuse is a common injury mechanism and a common cause of death in children
- Most children who suffer physical abuse are less than three years old
- Factitious disorder by proxy is a rare and difficult to recognize form of abuse in chronically ill children