Hospitalist Management of Child Abuse: Cases and Evidence-Based Practice

Snehal Shah, MD, Purvi Shah, MD, Jamie Kondis MD, Lisa Capra MD
July 20, 2017

Disclosures

We have no relevant financial relationships with the manufacturer(s) of any commercial product(s) and/or provider(s) of commercial services discussed in this CME activity.
GOALS AND LEARNING OBJECTIVES

• Identify conditions that mimic child abuse and unusual presentations
• Evaluate evidence based diagnostic yield of imaging modalities
• Differentiate special circumstances involving sexual abuse

Child Abuse Pediatrics

• Subspecialty of Pediatrics
  – Officially recognized as a subspecialty in 2006, first board examination given in 2009.
• Completion of a 3 year fellowship, including research component is required for board certification.
• Approximately 350 Board certified Child Abuse Pediatricians in the US.
• Professional societies:
  – SOCAN
  – Helfer Society
  – APSAC
Child Maltreatment

• 1 in 4 US Children will experience some form of maltreatment in their lifetime
• Nearly 4 million reports of abuse/neglect each year
• > 1 million substantiated cases each year
• For each substantiated case, there are 4-5 suspected cases
• Number 1 killer of children under age 4
• As a result of abuse, approximately 4 US children die each day

Types of Abuse

• Neglect
• Physical Abuse
• Sexual Abuse
• Emotional Abuse
• Caregiver Fabricated Illness aka Medical Child Abuse
  – Formerly known as Munchausen by Proxy
• Many Children experience more than one type of abuse!
Diagnostic Evaluation in Suspected Child Abuse

Purvi Shah, M.D.

Objectives

• Review the sentinel injuries that have a high probability of abuse
• Review the appropriate diagnostic evaluation for children with suspected abuse
Sentinel Injuries

- Retrospective analysis from PHIS database over a period of 8 years
- **Bruising** is the most common putative sentinel injury
- Rib fractures had the highest percentage of abuse diagnosis followed by intracranial hemorrhage and abdominal injury
- Frenulum laceration – in young infants (non-specific in older mobile children)

Common reasons for evaluation for physical abuse

- Pre-ambulatory children with bruising or fractures
- Multiple fractures
- Siblings of children with confirmed abuse
- Children with abusive burns

Prevalence of bruising in pediatric ED

- 2488 infants were examined
- 88 had bruising (3.5%)
- Bruising rates for under 5 months was 1.3% and above 5 months was 6.4%
- 20/88 (23%) infants with bruising received abuse evaluations
- 50% of the pre-mobile infants were evaluated
Bruising

- TEN-4
- Torso
- Ears
- Neck
- Under age 4

Why type of diagnostic evaluation can be done?

- Skeletal survey
- Neuroimaging
- Retinal examination
- Laboratory evaluation for abdominal injury
- Urinary toxicology screen
- Specific trauma evaluation as recommended by Trauma or Child Protection consultation i.e. Abdominal CT
Skeletal survey

- Should be performed on all children under 2 years with suspected abuse
- Children ages 2-5 based on clinical suspicion
- Older children with suspected abuse who have developmental delay or who are nonverbal
- Repeat skeletal survey should be done 2-3 weeks in cases with a high level of suspicion

American College of Radiology has a standard skeletal survey protocol of 21 images

<table>
<thead>
<tr>
<th>TABLE 1 - Complete Skeletal Survey Table™</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendicular skeleton</td>
</tr>
<tr>
<td>Arms (AP)</td>
</tr>
<tr>
<td>Forearms (AP)</td>
</tr>
<tr>
<td>Hands (PA)</td>
</tr>
<tr>
<td>Thighs (AP)</td>
</tr>
<tr>
<td>Legs (AP)</td>
</tr>
<tr>
<td>Feet (PA or AP)</td>
</tr>
<tr>
<td>Axial skeleton</td>
</tr>
<tr>
<td>Thorax (AP and lateral), to include thoracic spine and ribs</td>
</tr>
<tr>
<td>AP abdomen, lumbar spinal, and bony pelvis</td>
</tr>
<tr>
<td>Lumbar spine (AP and lateral)</td>
</tr>
<tr>
<td>Cervical spine (AP and lateral)</td>
</tr>
<tr>
<td>Skull (frontal and lateral)</td>
</tr>
</tbody>
</table>

All indicates anteroposterior/PA, posteroanterior.

Pediatrics 123:1430-1435
Classic Metaphyseal Fracture, aka “Corner fracture”

[Image of a bone with an arrow pointing to a fracture]


Classic Metaphyseal Fractures, aka “Bucket handle fracture”

[Image of a bone with an arrow pointing to a fracture]

Posterior rib fractures


Posterior rib fractures: mechanism of injury
Neuroimaging

- Some type of neuroimaging is indicated on all children under 12 months with suspected physical abuse
- For older children with the clinical suspicion of inflicted brain injury

**CT**
- Non-contrast CT should be done if clinically indicated per your closed head injury protocol
- Faster
- Readily available
- No sedation required

**MRI**
- More sensitive in detecting subtle trauma as well as providing additional information regarding dating of the trauma
- No radiation
- Needs Sedation
What about ultrafast MRI?

• Small study of 24 patients
• Compared non contrast CT vs. Ultrafast MRI vs. Standard MRI
• Standard MRI had a higher sensitivity compared to non contrast CT and ultrafast MRI

Retinal hemorrhages

• Numerous, bilateral, multilayered hemorrhages extending to the periphery is characteristic of acceleration-deceleration injury
• Retinal hemorrhages are present in 80% of cases of abusive head trauma
• If a retinal exam is done, it should be performed by a pediatric ophthalmologist to ensure adequate sensitivity
Retinal hemorrhages

- There is a growing body of evidence that if neuroimaging is negative then a retinal exam may not be needed.
Evaluation for Abdominal Injury

- AST, ALT, amylase, lipase, UA
- Low threshold for children under 2 with unexplained injuries
- Older children with a positive history of abdominal trauma and abdominal pain
- Abdominal bruising

Urine Toxicology Screen

- Altered mental status
- History of parental drug use
- Medical neglect
Physical Abuse Case Examples:

• Points to ponder while reviewing the cases
  – Are you more concerned about physical abuse, or a medical process?
  – What type of lab studies would you order?
  – What type of imaging studies would you order?
  – Would you make a report to Child Protective Services?
  – Are there other specialty services that you would want to consult?

Case One Summary

7 month old male presents to ER with swelling and bruising of hand.
X-ray negative for fractures, “extensive dorsal hand soft tissue swelling.”
Case One Continued

• One month later returns with right hand swelling, bruising at knuckles x 1 day. Also has Bruising left arm, L knee, L flank at various stages of resolution. No known family history of bleeding disorders
  – PMH: +bruising and hematomas with immunizations.
  – Surgeries: circumcision without complication.

• Skeletal survey WNL
• aPTT 100.6 Critical sec 23.0-40.6 / Factor VIII activity: <1
• PT 12.3 sec 12.0-16.1 / INR 0.89

Take Home Point – Swelling and bruising can lead towards bleeding disorder

Case One Photos
AAP Bleeding Disorder vs Abuse Algorithm

Brusling: Does the child need an evaluation for bleeding disorders? Situations in which a bleeding disorder evaluation may be needed:
- Clear disconnection or independently witnessed diffuse or confluent bruises
- Other medical findings consistent with abuse or nonaccidental trauma
- Object- or hand-patterned bruising
- History clearly explains bruising
- Clotting time greater than 8
- Punctuate at clothing line pressure sites
- Bruising at sites of object pressure, such as on the pattern and location of infant seat fasteners
- Severe bleeding disorders may also present with excessive diffuse bruising

2a. Initial Testing Panel
- Prothrombin time
- Activated partial thromboplastin time
- VWF antigen
- VWF activity (stabilized collagen
  - Factor IX level
- Complain blood count with platelet count

Intracranial hemorrhage: Does the child need an evaluation for bleeding disorders? Situations in which a bleeding disorder evaluation may be needed:
- Cerebrospinal fluid loss
- Intracranial hemorrhage
- Other medical findings consistent with abuse

3a. Initial Testing Panel
- Prothrombin time
- Activated partial thromboplastin time
- VWF antigen
- VWF activity (stabilized collagen
- Factor IX level
- Complain blood count with platelet count

3. Obtain test results or further testing needed
- Consult a pediatric hematologist

* From: Anderst JD, Carpenter SL, Abshire TC; Section on Hematology/Oncology and Committee on Child Abuse and Neglect of the American Academy of Pediatrics.
AAP Bleeding Disorder vs Abuse Algorithm

Intracranial hemorrhage: Does the child need an evaluation for bleeding disorders? Situations in which a bleeding disorder evaluation may be indicated:
- Independently witnessed trauma (abusive or otherwise)
- Other medical findings consistent with abuse

26. Initial Testing Panel
- Prothrombin time
- Activated partial thromboplastin time
- Factor VIII level
- Factor IX level
- Complete blood cell count with differential
- D-Dimer

Case Two summary

- LM is a 6 week old term healthy male presents with increased fussiness for 24 hours. Several hours prior to presentation noticed his right arm to be limp and not moving it very much. No known trauma.

- Baby is watched solely by parents and paternal grandparents. X-rays of clavicle, forearm, and elbow done and are within normal limits. Transferred to tertiary care center for further workup. Infectious workup initiated with normal results. Admitted to neurology as an inpatient. On MRI noted to have humerus fracture. Discharged home at that time.
Case Two Follow-Up

- Returns to ED 2 weeks later from PCP office with concern of crepitus over left tibia and femur. Skeletal survey done at that time. R healed femur fracture, Left healed femur fractures, healed rib fracture on L 3-6 ribs. Compression fractures of spine T12-L2. Noted osteopenia and wormian bones of the skull concerning for OI.
- Take home points: Early skeletal survey. Humerus fracture in 6 week old requires further workup.

Case 2 X-rays

Multiple healed and healing fractures. Given the multiple fractures, including healed fractures at 45 days of life and Wormian bones, osteogenesis imperfecta should be considered.
Case Three Summary

- JB and AB are 4 and 5 year old sibling boys who presented with a chief complaint by his aunt, who is also his guardian, that his behavior (as well as his older brother’s) was worsening.
- She described behaviors such as pouring liquids on the floor, urinating and defecating on the floor, throwing stool, and hitting/throwing things at family members. She also described him as getting out of his car seat and trying to attack the driver of the car. She left the brothers in the ED and had not returned to the hospital and was unreachable.

- Josiah was evaluated by psychiatry and admitted to the hospital for potential inpatient psychiatry placement. While on 7E, he was noted to have numerous loop-shaped marks to his body and the CPP team was consulted. Physical findings Multiple healing loop-shaped marks on legs, abdomen, back and buttocks, healing linear marks to legs, back, and arms.
Sexual Abuse Evaluation

Objectives

• Recognize findings concerning for sexual abuse

• Recognize when to report or refer

• Examination of children who present with concerns of sexual abuse

• Acute treatment of children who have been sexually abused
Sexual Abuse

• Definition per AAP:
  "a child is engaged in sexual activities that he or she cannot comprehend, for which he or she is developmentally unprepared and cannot give consent, and/or that violate the law or social taboos of society"

• Oral-genital, genital or anal contact
• Exhibitionism, voyeurism, pornography

Presentation

• Acute evaluation after an event
• Self report or witnessed event
• Concerned caretaker
• Referral for evaluation from law enforcement or social services
• Incidental findings on examination/Discovery of an STI
History

- Enough information to assess event
- Careful objective documentation
- Interview parent separately
- Non-leading questions

Evaluation

- Credible evidence/story concerning for abuse->report
- Is it possible the contact resulted in transfer of biologic material?
- If so, did the event occur within the past 72 hours?
- Is there acute injury?
- Immediate examination
Examination

- Minimize emotional trauma
- Sexual maturity
- Evidence of protective injuries (arms, hands, legs)
- Collection of forensic evidence (SANE nurse or trained physician)
- Documentation of trauma - photos

Exam

- Mouth & breasts
- Females: medial thighs, labia majora and minora, clitoris, urethra, periurethral tissue, hymen, hymenal opening, fossa navicularis, posterior fourchette, perineum, and perianal tissue
  - Improved exam using 3 different positions
- Males: penis, scrotum, perineum and perianal tissues
Examination of prepubital genitalia

JAMA, Dec 17, 2008 "Has this prepubital girl been sexually abused?"

Supine labial separation method

Comparison of examination methods used in the evaluation of prepubertal and pubertal female genitalia: A descriptive study
Supine labial traction technique

Comparison of examination methods used in the evaluation of prepubertal and pubertal female genitalia: A descriptive study

Prone knee-chest position

Comparison of examination methods used in the evaluation of prepubertal and pubertal female genitalia: A descriptive study
Suspicious findings

- Abrasions/bruising of genitalia
- Acute or healed tear in posterior aspect of hymen that extends to base
- Injury or scarring of posterior fourchette, fossa navicularis or hymen
- Anal bruising or lacerations
- Presence of an STI

STI testing

- Considerations: age of child, type of contact, timing of contact, signs/symptoms of STI, family member or sibling with STI, abuser with risk factors for STI, prevalence of STIs in community, exam findings, family/child request
- Universal screening of post-pubertal children: Urine NAAT for Gonorrhea/Chlamydia, Trichomonas vaginal culture, serologies for HIV, Syphilis, rectal and throat cultures as indicated
- Prepubertal children: low yield in asymptomatic children
- Lesions suggestive of HSV should be swabbed and cultured. HPV lesions diagnosed clinically.
### CDC guidelines

- Confirmed GC, Chlamydia, HIV, Syphilis are confirmed evidence of abuse
- Trichomonas and HSV are highly suspicious for abuse
- Condylomata possibly suspicious – consider reporting
- Bacterial vaginosis is indeterminate - medical follow up

### Other considerations

- Possibility of pregnancy?
- Is the child in a safe and protective setting?
- Is the child exhibiting behavior that could result in injury to self or others?
- Referral to outpatient evaluation by child abuse expert
Questions for discussion

• Report?

• Immediate interventions?
  – Testing?
  – Evidence collection?
  – Prophylaxis?

• Follow up?
Sexual Abuse Case #1

• Mary is a 15 year old girl who presents to your Community Hospital ED after attending a party at her older sister’s college dorm. She states that she drank several beers and started feeling sick so she went to lie down. She woke up with a “strange guy” on top of her and her clothing was off and she could feel him “having sex” with her. She is complaining of genital pain.

• What evaluation should you do for Mary?
• What testing should you do?
• What medications should you offer her?

Sexual Abuse Case #1 - Management

• Evaluation includes
  Rape kit (if she consents)
  Drug screen
  All STI testing (HIV, RPR, Gonorrhea/Chlamydia, Trichomonas NAAT)
  All prophylaxis should be offered (HIV, Gonorrhea, Chlamydia, Trichomonas NAAT, Pregnancy prophylaxis)
Sexual Abuse Case #2

- Mrs. Jones brings her 2 year old granddaughter Chloe in for an examination at 7 p.m. on Sunday night. She states that she picked up Chloe from her father’s house that night and went to change her diaper and Chloe looked very red “down there” and her “hole looked stretched out” and bigger than the last time that Mrs. Jones had changed her. Mrs. Jones asked Chloe if anyone had touched her and she said “Daddy.” Mrs. Jones would like a full evaluation, including a “rape kit” to see if anyone has been molesting Chloe.
- What evaluation should you offer in this situation?
- What testing should you do?
- What medications should you offer her?

Sexual Abuse Case #2

- Normal Prepubertal genital exam
Sexual Abuse Case #2 - Management

- Good Physical Exam
- With no disclosure of sexual abuse or witness to the assault, does not need a rape kit unless you see injury on the exam
- Does not need testing, but can offer urine STI testing (if caregiver insistent, urine is non-invasive)
- Does not need any prophylaxis

Sexual Abuse Case #3

- 3 yo boy brought in by mother for bruising around anus. He started a new in home daycare 3 days ago and has had difficulty stooling. Wiping him tonight mother noticed redness and bruising
- Pt unable to say what happened, exam showed bruises on buttocks, around anus, superficial laceration adjacent to anus
- ED exam and photos, reviewed by CPT 2 days later, follow up 2 weeks later with Sexual Abuse Management Clinic, STI testing done
- 2 weeks later bruising and laceration have resolved
Sexual Abuse Case #3

- SANE should have been called when patient first in ED due to anal bruising/laceration
- A rape kit would have been done at that time
- STI prophylaxis offered (HIV)
- STI testing done
Testifying in Court

• Most Pediatricians feel unprepared to testify!
• You may be called as a Fact Witness or an Expert Witness
• You may be subpoenaed for a:
  – Deposition (Civil or Criminal)
  – Family Court Hearing
  – Pre-trial Hearing
  – Grand Jury Hearing
  – Criminal Trial
Fact Witness

• You were likely the most senior treating Pediatrician.
• You will be asked to testify about facts of the case such as the location of injuries or statements made in the history by the patient or parents.
• There may also be expert witnesses testifying in the trial.

Expert Witness

• You can be declared an Expert Witness in your own field (General Pediatrics).
• You will be asked your opinion about the findings in a case.
• Expert witnesses can charge for their time preparing and testifying in a trial.
Tips for Court Preparation

• Make sure you have an up to date copy of your CV and can explain everything on it, including your training, any professional memberships, and CME.
• Study all of the medical records, including notes that were not your own, but especially any documentation that you prepared.
• Meet with the attorney to prepare ahead of time!
• If testifying as an Expert Witness, make sure that you study any relevant literature on the topic ahead of time and be prepared to cite any of your sources.

For More Information...

AMERICAN ACADEMY OF PEDIATRICS

TECHNICAL REPORT

Expert Witness Participation in Civil and Criminal Proceedings

Children's Hospital

7/6/2017
Educational Resources:

- SOCAN, the AAP Section on Child Abuse and Neglect.
  - The requirement for members is: “Must be actively involved in some aspect of the study of abuse and neglect of infants, children or adolescents.”
  - $40 per year. Includes a Listserve.
- Materials from the AAP
  - Child Abuse Pediatric Review Materials (new materials to help train for child abuse pediatrics board examination): $150
  - Pedialink online courses (Cutaneous injury, Abusive Head trauma, Biomechanics) $24
- Fourth edition, “The Visual Diagnosis of Child Abuse” Flash Drive: $175
- AAP policy statements:

Educational Resources

- NYS Champ program (www.champprogram.com) geared toward NY State medical providers, but website has open access to information.
- Open Pediatrics: www.openpediatrics.org
  - Set of 6 video lectures on child abuse topics.
- National Children's Advocacy Center: A series of online recorded trainings and webinars.
Child Protector App

- Free from the App store and Google play
- Provides educational modules and decision trees
- Recently updated, version 2.0 has 60 new illustrations/animations including bruises and burns.

References

Questions???
Snehal Shah – Shah_S@Wustl.edu