Non-Accidental Trauma Clinical Practice Guideline

Section I

I. Recognizing Child Physical Abuse

Child physical abuse is non-accidental physical injury as a result of punching, beating, kicking, biting, shaking, throwing, stabbing, choking, hitting, burning, or otherwise harming a child that is inflicted by a parent, caregiver, or other person who has responsibility for the child. Such injury is considered abuse regardless of whether the caregiver intended to hurt the child.

II. Risk Factors for Physical Abuse

A. Parent or Caregiver Factors
   1. Personality characteristics
   2. Psychological well-being (untreated/inadequately treated mental illness)
   3. History of maltreatment
   4. Substance abuse
   5. Attitudes and knowledge
   6. Immaturity

B. Family Factors
   1. Non-biological parental male living in the home
   2. Marital conflict/domestic violence
   3. Lower economic status
   4. High stress level/lack of social support

C. Child Factors
   1. Age $\leq$ 3 years have the highest risk
   2. Disability (physical/cognitive/emotional)
   3. Prematurity
   4. Long-awaited child

D. **The absence of risk factors is not the absence of risk!!!**

III. Bruising and Other Skin Trauma

A. Bruising of any child under 4 months of age warrants a full child abuse work-up
   1. **TEN/4 rule** for body region/age raising clinical suspicion for abuse
   2. Any child under the age of 4 years with a bruise on the torso (including perineum and buttocks), ears, and neck without corroborated story should raise level of suspicion and have low threshold to perform complete child abuse work-up for age.

B. Bite marks
   1. Inflicted adult bite marks are very worrisome – typically indicate a more sadistic abuser
   2. Measurement of diameter can be helpful determination of adult vs. child but can still be difficult
   3. Swabbing fresh bite marks can help identify perpetrator by DNA analysis
   4. Photography of bite marks (and all inflicted injuries) is very important – include scale
   5. Most common perpetrator is TODDLER

IV. Burns

A. Beware of clearly sharply demarcated edges on burns.
   1. No splash marks should be very worrisome
   2. Burns can change in appearance in a matter of hours
   3. Photo documentation should be done IMMEDIATELY if the child is otherwise stable

B. It is concerning if there are a predominance of second and third degree burns

V. Abusive Head Trauma

A. Global brain injury caused by rotational forces

B. Involves shaking, impact, or both

C. Subdural hematomas, +/- retinal hemorrhage, bruising, fractures

D. #1 cause of death in child physical abuse

E. "Shaken baby syndrome"
   1. Often triggered by crying
   2. Not typically a one-time event
   3. Many times, these children present with NO history of trauma
   4. Beware of vomiting without diarrhea – this is a commonly missed presentation for abusive head injury.
   5. Beware of rapid increase in head circumference. *Consider head CT in any child who has crossed two major percentile lines in head circumference in a short time (a few months).*

VI. Abdominal Trauma

A. Any abrasion or bruise on the abdominal area should prompt labs

B. If labs are abnormal, then imaging should be obtained

C. FAST scan/ultrasound is <u>not</u> sufficient.

D. This would be a case where an injury may not be medically significant, but it could have significant forensic implications, so more detailed imaging is needed

VII. Skeletal Trauma

A. **Buckle fractures** in any child under 9 months of age are of concern due to a lack of mobility and underdeveloped protective reflexes that might lead to an "accidental" mechanism such as falling on an outstretched arm

B. **Spiral fractures** – can occur from seemingly innocuous trauma such as tripping while running and are not always indicative of abuse

C. **Transverse fractures** – the mechanism should reflect the specific type and magnitude of forces required to cause this specific fracture morphology

D. **Metaphyseal corner fractures** – highly suspicious for abuse. Often associated with soft tissue injury as well.

Section II

I. Documentation

A. Questions to Ask
1. Who is/are the primary caregivers?
2. When did the caregivers first notice symptoms/bruises?
3. Does the history change with changing information given to the caregiver?
4. Do different witnesses give different accounts?
5. What did they do after they noticed these symptoms?
6. When was the last time the child was acting normally?
   a) In young infants it can be difficult to tell
   b) Tracking, cooing, smiling, eating without vomiting
7. Have there been any accidents?
8. Are there other children at home or not living with the family?
9. Has the child had any injuries before?
10. Is there a history for SIDS or any other unexpected death of a young child?

B. What to Document
1. Detailed physical examination documentation with appropriate drawings
2. Photo-documentation as soon as possible is fast-becoming the standard of care
3. Be sure the child is completely unclothed during examination and the lights are on in the room
4. Document location, size, and shape of all bruising or unusual markings
5. A careful and well documented history
6. Use quotes whenever possible
7. Document detailed descriptions of the mechanisms of injury or injuries with inclusion of the progression of symptoms
8. Also make note of what the caregiver did after these events/symptoms

C. Photo Documentation
1. The pediatric hospitalist team is available to take photographs and appropriately store the images.
2. Informed consent is <u>not</u> required in open investigations of child abuse
3. Photograph injuries:
   a) prior to treatment
   b) from different angles (at least 2 pictures of each injury)
4. Use a ruler or measurement device to give perspective. A paper measuring tape used for measuring head circumference with a patient label attached is a great way to accomplish this
5. Include the patient's face (with identifiers) in at least one of the pictures

6. Document the patient's name, injury location, date, photographer on/in picture (a patient label is great for this)

II. Work-up for Child Physical Abuse

A. < 12 months

1. Skeletal survey
   a) Consult Orthopedic Surgery if abnormal findings identified
   b) Follow-up skeletal survey should be performed within 10 to 14 days
2. Trauma labs
   a) CBC, CMP, PT, PTT, lipase, and urinalysis
   b) The urinalysis is looking for blood and can be a bag specimen
   c) Consider CK and platelet function analysis if extensive bruising
3. CT of head without IV contrast
   a) If head/neck/ear/face bruising or swelling
   b) If signs or symptoms of neurological impairment present
   c) Consult Neurosurgery if abnormal finding identified
4. MRI of head
   a) If evidence of trauma on physical exam
   b) If head CT is abnormal at all, a MRI should be obtained
   c) This often requires sedation and can be performed after the child is admitted
5. Dilated fundoscopic exam
6. CT of abdomen/pelvis with IV contrast – if trauma labs abnormal
7. Pediatric surgery consult for any of the following
   a) Positive trauma labs
   b) Bruising on abdomen/trunk
   c) Bilious vomiting
   d) To arrange follow-up skeletal survey

B. 13 to 24 months

1. Skeletal survey
   a) Consult Orthopedic Surgery if abnormal findings identified
   b) Follow-up skeletal survey should be performed within 10 to 14 days
2. Trauma labs
   a) CBC, CMP, PT, PTT, lipase, and urinalysis
   b) The urinalysis is looking for blood and can be a bag specimen
   c) Consider CK and platelet function analysis if extensive bruising
3. CT of head without IV contrast
   a) If head/neck/ear/face bruising or swelling
   b) If signs or symptoms of neurological impairment present
   c) Consult Neurosurgery if abnormal finding identified
   d) If head CT is abnormal at all, a MRI should be obtained
4. Dilated fundoscopic exam – if brain injury present
5. CT of abdomen/pelvis with IV contrast – if trauma labs elevated
6. Pediatric surgery consult for any of the following
   a) Positive trauma labs
   b) Bruising on abdomen/trunk

c) Bilious vomiting
d) To arrange follow-up skeletal survey

C. <u>2 to 5 years</u>

1. Skeletal survey
   a) If severe trauma
   b) If child is non-verbal, unresponsive, or extreme developmental delay
   c) Consult Orthopedic Surgery if abnormal findings identified
   d) Follow-up skeletal survey should be performed within 10 to 14 days
2. Trauma labs
   a) CBC, CMP, PT, PTT, lipase, and urinalysis
   b) The urinalysis is looking for blood and can be a bag specimen
   c) Consider CK and platelet function analysis if extensive bruising
3. CT of head without IV contrast
   a) If head/neck/ear/face bruising or swelling
   b) If signs or symptoms of neurological impairment present
   c) Consult Neurosurgery if abnormal finding identified
   d) If head CT is abnormal at all, a MRI should be obtained
4. Dilated fundoscopic exam – if brain injury present
5. CT of abdomen/pelvis with IV contrast – if trauma labs abnormal
6. Pediatric surgery consult for any of the following
   e) Positive trauma labs
   a) Bruising on abdomen/trunk
   b) Bilious vomiting
   c) To arrange follow-up skeletal survey

Suggested Guidelines for
Evaluation for Suspected Child Physical Abuse

	Head CT or MRI	Skeletal Survey	Labs*	Abdominal CT	Ophthalmology Consult	Social Work Consult
0-1 year	Yes	Yes	Yes	If bruising on abdomen or elevated transaminases	Yes	Yes
1-2 years	Consider**	Yes	Yes	If bruising on abdomen or elevated transaminases	If Neuroimaging +, skull fracture, head injury, decreased mental status	Yes
2-5 years	No	Only if extensive injury or developmental delay	Yes	Obtain if symptomatic or suggested by physical exam	Not typically recommended	Yes
Above 5 years	No	No	No	Obtain if symptomatic or suggested by physical exam	Not typically recommended	Yes

- * Labs include: CBC, CMP, Lipase, PT, PTT, and ***bag*** UA, also consider urine tox scrren
- ** Indicated if decreased mental status, skull fracture, or head injury

D. Follow-up skeletal survey

1. Should be performed 10 to 14 days after the initial skeletal survey
2. The hospital social worker will schedule this appointment prior to discharge
3. The patient will follow up in pediatric surgery clinic to be examined and to have study radiographs completed
4. If new findings are identified during this visit, a hospital social worker will be notified, and the child will be admitted to the pediatric hospitalist service for further evaluation

III. Reporting

A. First call should always be to the social worker (in-house or on call)
   1. The social worker will interview the family
   2. They can help facilitate communication with DCBS and the police

B. In Fayette County:
   1. Protection and Permanency
   2. (859) 245-5258

C. Child Protection Hot Line
   1. (800)752-6200

D. If outside the county, may go to the following address:
   1. https://apps.chfs.ky.gov/Office_Phone/index.aspx
   2. If you have questions and need further assistance, call the University of Louisville Forensics Department (502) 629-6000 (ask for Forensics clinician on call)

E. Remember: the report must be made in the county in which the event occurred!!

IV. Selected References

1. The Children's Hospital of Philadelphia. ED Pathway for Evaluation/Treatment of Children with Physical Abuse Concerns. Available on the internet at: http://www.chop.edu/pathways/emergency-department/physical-abuse-concerns/

2. Kellogg ND. Evaluation of Suspected Child Physical Abuse. Pediatrics 2007;119:1232-41. http://pediatrics.aappublications.org/content/119/6/1232.full.html

3. Diagnostic Imaging of Child Abuse. Pediatrics 2009;123:1430-5. http://pediatrics.aappublications.org/content/123/5/1430.full.html

4. Lindberg DM, Shapiro RA, Blood EA, et al. Utility of Hepatic Transaminases in Children With Concern for Abuse. Pediatrics 2013;131:268-75. http://pediatrics.aappublications.org/content/131/2/268.full.html

5. Harper NS, Eddleman S, Lindberg DM. The Utility of Follow-up Skeletal Surveys in Child Abuse. Pediatrics 2013;131:e672-8. http://pediatrics.aappublications.org/content/131/3/e672.full.html

6. Pierce MC, Kaczor K, Aldridge S. Bruising Characteristics Discriminating Physical Child Abuse From Accidental Trauma. Pediatrics 2010;125:67-74. http://pediatrics.aappublications.org/content/125/1/67.full.html

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Altered Infant/Child

Suspected abuse?

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Assess and manage ABCs

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Admit to PICU
Consult Peds Surgery and/or Neurosurgery

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When patient condition stable:

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Obtain head CT
(or MRI)

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Obtain Skeletal Survey

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Consult Ophthalmology

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Notify Social Worker

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Supportive Care

Pediatric Trauma Survey Views and Image Order

	Views to be obtained and Image Order for PACS
	AP Skull
	Right Lateral Skull
	Left Lateral Skull
	AP Chest
	Right Oblique Ribs

	Left Oblique Ribs
	AP Abdomen/Pelvis
	AP Right Humerus
	Lateral Right Humerus
	AP Left Humerus
	Lateral Left Humerus
	AP Right Forearm
	Lateral Right Forearm
	AP Left Forearm
	Lateral Left Forearm
	Right PA Hand
	Left PA Hand
	AP Right Femur
	Lateral Right Femur
	AP Left Femur
	Lateral Left Femur
	AP Right Tib/Fib
	Lateral Right Tib/Fib
	AP Left Tib/Fib
	Lateral Left Tib/Fib
	AP Right Foot
	AP Left Foot
	Lateral C-Spine
	Lateral T/L-Spine