Recognizing and Responding to Child Maltreatment

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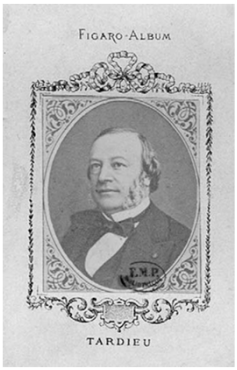
Associate Professor of Pediatrics
Washington University School of Medicine,
Section of Child Abuse Pediatrics,
Child Abuse Pediatrician

Role of Child Abuse Pediatricians?

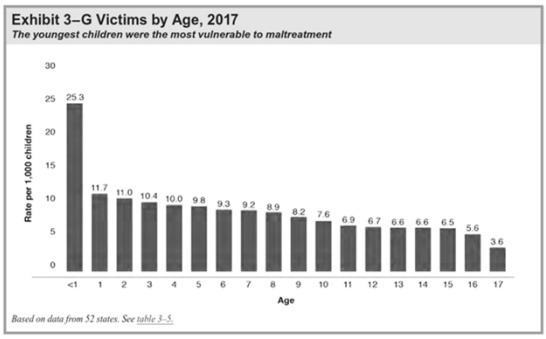
- Accurately diagnosis abuse
- Consult with community agencies
- Provide expertise in courts of law
- Treat consequences of maltreatment
- Direct child maltreatment treatment and prevention programs
- Participate in multidisciplinary teams investigating and managing child abuse cases

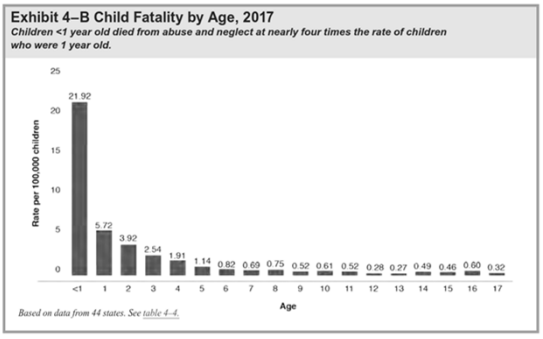


Ambroise Tardieu

- Forensic Physician
- Wrote forensic study "Offenses against morals" in 1857.
- Published series of severe and fatal child maltreatment cases, including sexual abuse in 1860.

- 4.1 million hotline reports (involving 7.5 million children)
- 3.5 million children subject of investigation
- 674,000 substantiated victims
  - 75% neglected
  - 18% physically abused
  - 9% sexually abused
- 1,720 deaths
  - 72% were younger than 3 years old





Child Abuse in the Medical Setting

How does child abuse present to the medical provider?

- Adult verbalizes concern for abuse
- Suspicious injury
- Suspicious diagnosis
- Suspicious behavior
- Child discloses abuse
- Adult admits abuse
- Through routine screening questions

A medical evaluation should be performed to:

- obtain a history from child/guardian
- consider alternative explanation for a concerning sign or symptom
- diagnose and treat medical consequences of abuse
- diagnose and treat medical conditions unrelated to abuse
- collect forensic evidence
- assess the child for any developmental, emotional, or behavioral problems needing further evaluation and treatment and make referrals as necessary
- assess the child's safety and make a report to child protective services if needed
- reassure the child and family
- document findings in such a way that information can be effectively and accurately presented to investigating agencies

History Taking

- The initial history is frequently the most important piece of "evidence" in a maltreatment case.
  - History from caregiver
  - History from child (if verbal)
- Obtained with open-ended prompts
- Provided with privacy
- Documented verbatim

History Taking

- A complete history and review of systems may
  - give information about medical and/or behavioral consequences of abuse.
  - provide another cause of a medical and/or behavioral presentation.

Physical Examination

- A complete comprehensive physical exam
  - All skin surfaces with emphasis on frequently missed areas (oral, behind ear, genital).
  - Growth parameters
- Good documentation in 2 forms:
  - Written description
  - Diagram or drawing
  - Photodocumentation
- Document findings that may be confused with abusive findings.

Physical Examination

Do not forget that:

A child's normal physical examination does not mean that child is not a victim of child maltreatment. In fact, a normal exam is the most frequent presentation of an abused child.

The detection and diagnosis of child physical abuse depends on clinician's ability to

- Recognize suspicious injuries
- Conduct a careful and complete physical examination with judicious use of auxiliary tests
- Consider whether the caregivers' explanation is supported by characteristics of the injury and child's developmental capabilities

Kellogg ND and Committee on Child Abuse and Neglect
Evaluation of Suspected Child Physical Abuse
Pediatrics 2007;119;1232-1241

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"Bruising is one of the earliest, most common, and easily recognizable signs of physical child abuse."

Kaczor, et al, Bruising and Physical Child Abuse Clin Ped Emerg Med 7:153-160

All kids have bruises, right?

- The presence of bruising is clearly associated with developmental abilities.
  - Bruising extremely rare (0.6%) in infants <6months
  - Uncommon (1.7%) in infants <9 months
  - Only 2.2% of precruisers (no upright ambulation)
  - 17.8% of cruisers
  - 51.9% of walkers

Sugar et al
Bruises in infants and toddlers:
Those who don't cruise rarely bruise.
Arch Pediatr Adolesc Med 1999; 153:399-403

Where are those normal bruises?

- 93% of all bruises were located over anterior bony prominences
  - Anterior tibia
  - Knee
  - Forehead
  - Scalp
- Rarely seen on posterior, softer areas
  - buttocks, abdomen, cheeks, hands

ORIGINAL ARTICLE

Are there patterns of bruising in childhood which are diagnostic or suggestive of abuse? A systematic review

S Maguire, M K Mann, J Sibert, A Kemp

Arch Dis Child 2005;90:182–186. doi: 10.1136/adc.2003.044065

Implications for practice

A bruise must never be interpreted in isolation and must always be assessed in the context of medical and social history, developmental stage, explanation given, full clinical examination, and relevant investigations.

Patterns of bruising that are suggestive of physical child abuse

- Bruising in children who are not independently mobile
- Bruising in babies
- Bruises that are seen away from bony prominences
- Bruises to the face, back, abdomen, arms, buttocks, ears, and hands
- Multiple bruises in clusters
- Multiple bruises of uniform shape
- Bruises that carry the imprint of implement used or a ligature

Other soft tissue/skin findings

- Oral injuries
- Abrasions
- Lacerations
- Patterned Injuries
  - Looped Marks
  - Bite Marks

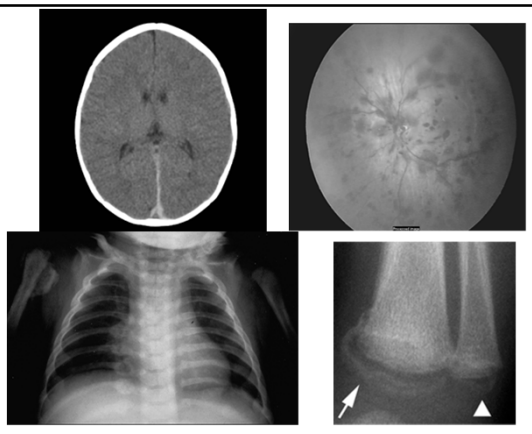
Abusive Head Trauma

- Also known as:
  - "Shaken Baby Syndrome"
  - Inflicted Traumatic Brain Injury
  - Non-accidental Brain Trauma
- Abusive Head Trauma is the most common cause of trauma-related death in infants

Pediatric Abusive Head Trauma

"…is defined as an injury to the skull or intracranial contents of an infant or young child due to inflicted blunt impact and/or violent shaking."

Parks SE, Annest JL, Hill HA, Karch DL. *Pediatric Abusive Head Trauma: Recommended Definitions for Public Health Surveillance and Research.* Atlanta (GA): Centers for Disease Control and Prevention; 2012



ELSEVIER

Forensic Science International
96 (1998) 215–230

Forensic Science International

Bruising in non-accidental head injured children; a retrospective study of the prevalence, distribution and pathological associations in 24 cases

G.S. Atwal[a], G.N. Rutty[b,*], N. Carter[b], M.A. Green[b]

[a]Manchester Medical School, Manchester University, Stopford Building, Oxford Road, Manchester, UK
[b]Department of Forensic Pathology, University of Sheffield, Medico-Legal Centre, Watery Street, Sheffield, UK

Received 13 April 1997; received in final revised form 30 July 1998; accepted 30 July 1998

"external bruising may be absent in children with fatal intracranial injury."

Vol. 56, No. 2 AUGUST, 1946

MULTIPLE FRACTURES IN THE LONG BONES OF INFANTS SUFFERING FROM CHRONIC SUBDURAL HEMATOMA*

By JOHN CAFFEY, M.D.
NEW YORK CITY

FRACTURES of the cranium are not infrequently associated with infantile subdural hematoma but fractures in the long bones have rarely been reported as complications of this intracranial lesion. An old fracture of the radius is mentioned by Sherwood[1] in his fifth case. Ingraham and Heyl[2] demonstrated greenstick fractures roentgenographically in the radiuses

convulsion which lasted for one-half hour, after which the infant was weak and listless for three days and strabismus with stare developed. During this period fever was present and vomiting was frequent. The mother, who had been with the infant continuously, had not observed injury to the head or extremities. Physical examination disclosed a tense bulging anterior fontanel, internal strabismus and exaggerated

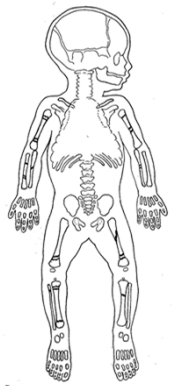


FIG. 7. Spot map of the skeleton showing the distribution of the 23 fractures in 6 patients.

ARTICLE

Incidence of Fractures Attributable to Abuse in Young Hospitalized Children: Results From Analysis of a United States Database

John M. Leventhal, MD*, Kimberly D. Martin, MPhil‡, Andrea G. Asnes, MD, MSW*

Departments of *Pediatrics and ‡Epidemiology and Public Health, Yale University School of Medicine, New Haven, Connecticut

The authors have indicated they have no financial relationships relevant to this article to disclose.

What's Known on This Subject

Only 1 regional study has estimated the incidence of fractures attributable to abuse among young children. No national US data examining the incidence of this problem are available.

What This Study Adds

This is the first US study examining the incidence of fractures attributable to abuse among hospitalized young children. This study shows the strengths and limitations of using a national database to estimate the incidence of this problem.

Pediatrics 2008;122;599-604

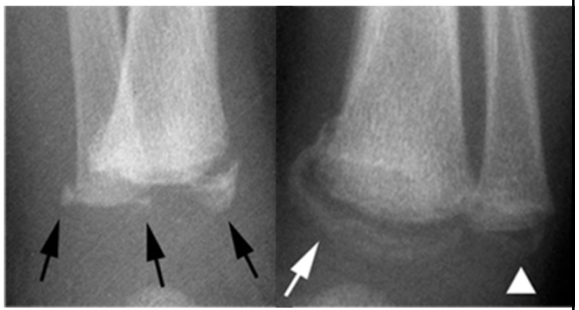
TABLE 4 Weighted Proportions of Fractures Attributable to Abuse, According to Age and Bone, in the 2003 KID

	0–11 mo		12–23 mo		24–35 mo		0–36 mo	
	No. of Fractures	Proportion From Abuse, %	No. of Fractures	Proportion From Abuse, %	No. of Fractures	Proportion From Abuse, %	No. of Fractures	Proportion From Abuse, %
Ribs	809	69.4	96	28.5	96	27.6	1001	61.4
Radius/ulna	261	62.1	103	19.8	293	4.7	657	29.8
Tibia/fibula	493	58.0	192	16.1	384	4.7	1069	31.1
Humerus	518	43.1	545	6.8	2108	1.6	3172	9.3
Femur	1257	30.5	761	4.8	2008	2.5	4026	11.7
Clavicle	227	28.1	65	16.7	95	6.0	388	20.7
Skull	3363	17.1	948	8.6	1575	3.7	5886	12.1

Concerning fracture types

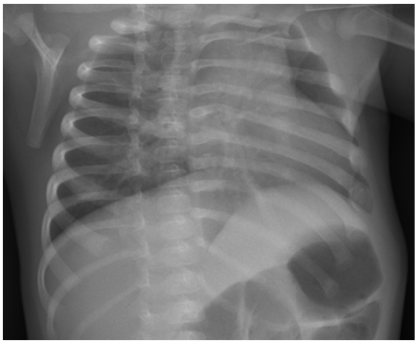
- Metaphyseal fracture
  - Bucket handle
  - Corner
- Posterior rib fractures
- Complex skull fractures

Metaphyseal fractures



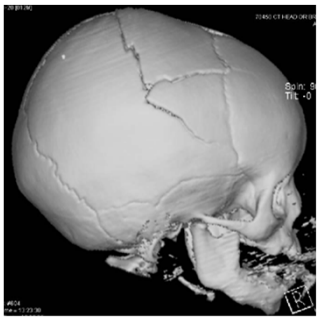
Corner Fractures = Bucket Handle Fractures

Posterior Rib Fractures



Complex Skull fractures

- Branching
- Multiple
- Diastatic
- Fragmented
- Displaced



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- Consider whether the caregivers' explanation is supported by characteristics of the injury and child's developmental capabilities

Contents lists available at ScienceDirect

Journal of Pediatric Surgery

journal homepage: www.elsevier.com/locate/jpedsurg

Review Article

Child abuse and the pediatric surgeon: A position statement from the Trauma Committee, the Board of Governors and the Membership of the American Pediatric Surgical Association☆

Mauricio A. Escobar Jr. [a,*], Kim G. Wallenstein [b], Emily R. Christison-Lagay [c], Jessica A. Naiditch [d], John K. Petty [e]

"APSA recommends the implementation of a standardized tool to screen for child physical abuse at all Trauma verified or designated hospitals and Children's Surgery verified hospitals. Further, APSA supports universal application of the screening tool regardless or socioeconomic, racial, ethnic or gender status."

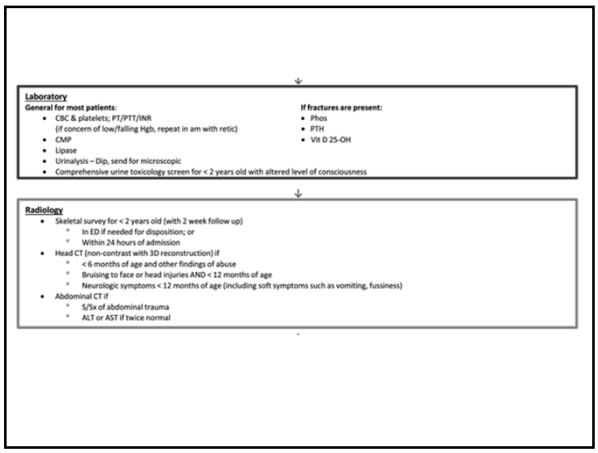
NON-ACCIDENTAL TRAUMA (NAT) SCREENING and MANAGEMENT GUIDELINE (Inpatient and Outpatient)

"Red Flag" History of Present Injury
- No history or inconsistent hx
- Changing history
- Unwitnessed injury
- Delay in seeking care
- Prior ED visit
- Domestic Violence in home
- Premature infant (< 37 weeks)
- Low birth weight/IUGR
- Chronic medical conditions
- Referred for suspected child abuse

"Red Flag" Physical Exam Findings Infant
- Torn frenulum
- FTT (weight, length, head circumference)
- Large heads in infants (consider measuring of OFC in children < 1 yr)
- Any bruise in any non-ambulating child - "if you don't cruise you don't bruise"
- Any bruise in a non-exploratory location (especially the TEN region - Torso (area covered by a standard girl's bathing suit), Ears and Neck) < 4yrs old (TEN-4)
- Bruises, marks, or scars in patterns that suggest hitting with an object

"Red Flag" Radiographic Findings
- Metaphyseal fractures (corner)
- Rib fractures (especially posterior)
- Any fracture in a non-ambulating infant
- An undiagnosed healing fracture
- SDH and/or SAH on neuro-imaging in young children, particularly in the absence of skull fracture < 1 year

Recommended evaluation in cases of suspected physical abuse
Note: Consider transfer to a Children's Hospital of patients with "Red Flag" findings
For a complete NAT workup.

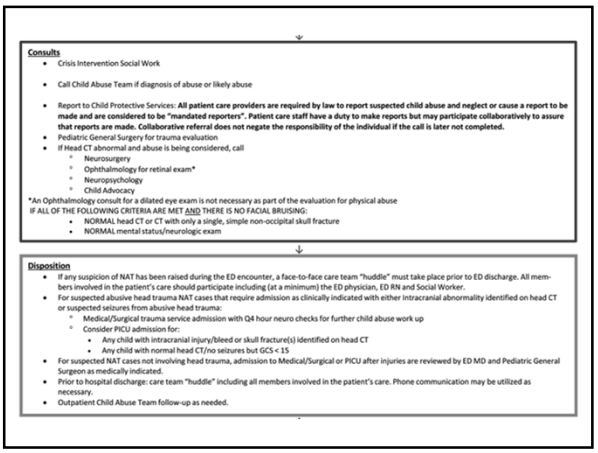


Laboratory

General for most patients:
- CBC & platelets; PT/PTT/INR (if concern of low/falling Hgb, repeat in am with retic)
- CMP
- Lipase
- Urinalysis – Dip, send for microscopic
- Comprehensive urine toxicology screen for < 2 years old with altered level of consciousness

If fractures are present:
- Phos
- PTH
- Vit D 25-OH

Radiology
- Skeletal survey for < 2 years old (with 2 week follow up)
  - In ED if needed for disposition; or
  - Within 24 hours of admission
- Head CT (non-contrast with 3D reconstruction) if
  - < 6 months of age and other findings of abuse
  - Bruising to face or head injuries AND < 12 months of age
  - Neurologic symptoms < 12 months of age (including soft symptoms such as vomiting, fussiness)
- Abdominal CT if
  - S/Sx of abdominal trauma
  - ALT or AST if twice normal



Consults
- Crisis Intervention Social Work
- Call Child Abuse Team if diagnosis of abuse or likely abuse
- Report to Child Protective Services: **All patient care providers are required by law to report suspected child abuse and neglect or cause a report to be made and are considered to be "mandated reporters". Patient care staff have a duty to make reports but may participate collaboratively to assure that reports are made. Collaborative referral does not negate the responsibility of the individual if the call is later not completed.**
- Pediatric General Surgery for trauma evaluation
- If Head CT abnormal and abuse is being considered, call
  - Neurosurgery
  - Ophthalmology for retinal exam*
  - Neuropsychology
  - Child Advocacy

*An Ophthalmology consult for a dilated eye exam is not necessary as part of the evaluation for physical abuse
IF ALL OF THE FOLLOWING CRITERIA ARE MET AND THERE IS NO FACIAL BRUISING:
- NORMAL head CT or CT with only a single, simple non-occipital skull fracture
- NORMAL mental status/neurologic exam

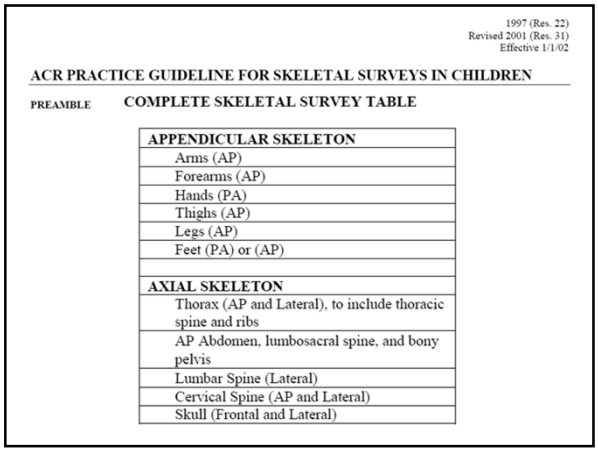
Disposition
- If any suspicion of NAT has been raised during the ED encounter, a face-to-face care team "huddle" must take place prior to ED discharge. All members involved in the patient's care should participate including (at a minimum) the ED physician, ED RN and Social Worker.
- For suspected abusive head trauma NAT cases that require admission as clinically indicated with either Intracranial abnormality identified on head CT or suspected seizures from abusive head trauma:
  - Medical/Surgical trauma service admission with Q4 hour neuro checks for further child abuse work up
  - Consider PICU admission for:
    - Any child with intracranial injury/bleed or skull fracture(s) identified on head CT
    - Any child with normal head CT/no seizures but GCS < 15
- For suspected NAT cases not involving head trauma, admission to Medical/Surgical or PICU after injuries are reviewed by ED MD and Pediatric General Surgeon as medically indicated.
- Prior to hospital discharge: care team "huddle" including all members involved in the patient's care. Phone communication may be utilized as necessary.
- Outpatient Child Abuse Team follow-up as needed.

Screening for Occult Fracture

- Imaging methods to detect acute or healing fracture that is not detectable on physical exam alone.
- Most helpful in children 2 years old and younger.
- Case by case in children 3-5 years old.
- Frequently unhelpful in children over 5 yo.

Skeletal survey indications

- All non-verbal children with a reasonable suspicion of physical abuse, including
  - Witnessed abusive event
  - Head injury
  - Fracture
  - Unusual bruising
  - Siblings with signs of abuse
  - Confession by perpetrator
- A child may be non-verbal because of
  - Developmentally non-verbal
  - Altered mental status
  - Severe pain, or pain control

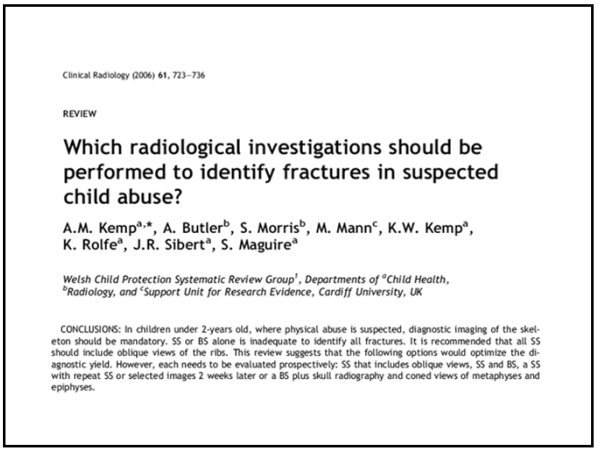


1997 (Res. 22)
Revised 2001 (Res. 31)
Effective 1/1/02

ACR PRACTICE GUIDELINE FOR SKELETAL SURVEYS IN CHILDREN

PREAMBLE **COMPLETE SKELETAL SURVEY TABLE**

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)



Clinical Radiology (2006) 61, 723–736

REVIEW

Which radiological investigations should be performed to identify fractures in suspected child abuse?

A.M. Kemp[a,*], A. Butler[b], S. Morris[b], M. Mann[c], K.W. Kemp[a], K. Rolfe[a], J.R. Sibert[a], S. Maguire[a]

Welsh Child Protection Systematic Review Group[†], Departments of [a]Child Health, [b]Radiology, and [c]Support Unit for Research Evidence, Cardiff University, UK

CONCLUSIONS: In children under 2-years old, where physical abuse is suspected, diagnostic imaging of the skeleton should be mandatory. SS or BS alone is inadequate to identify all fractures. It is recommended that all SS should include oblique views of the ribs. This review suggests that the following options would optimize the diagnostic yield. However, each needs to be evaluated prospectively: SS that includes oblique views, SS and BS, a SS with repeat SS or selected images 2 weeks later or a BS plus skull radiography and coned views of metaphyses and epiphyses.

Adequate Skeletal Imaging

- Skeletal survey with oblique rib views and repeat skeletal survey 14 days later

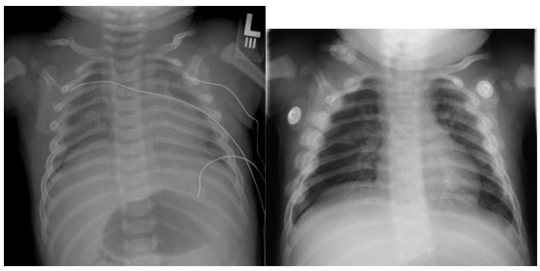
or

- Skeletal survey with oblique rib views and bone scan concurrently

or

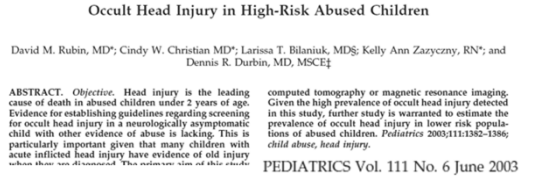
- Bone scan, skull films, and coned views of metaphyseal regions concurrently

Chest X-rays
April 6 and April 20



Screening for Abdominal Trauma

- AST
- ALT
- Amylase/Lipase
- Urinalysis
- As indicated:
  - CT of abdomen with contrast



Occult Head Injury in High-Risk Abused Children

David M. Rubin, MD*; Cindy W. Christian MD*; Larissa T. Bilaniuk, MD§; Kelly Ann Zazyczny, RN*; and Dennis R. Durbin, MD, MSCE‡

ABSTRACT. *Objective.* Head injury is the leading cause of death in abused children under 2 years of age. Evidence for establishing guidelines regarding screening for occult head injury in a neurologically asymptomatic child with other evidence of abuse is lacking. This is particularly important given that many children with acute inflicted head injury have evidence of old injury

computed tomography or magnetic resonance imaging. Given the high prevalence of occult head injury detected in this study, further study is warranted to estimate the prevalence of occult head injury in lower risk populations of abused children. *Pediatrics* 2003;111:1382–1386; *child abuse, head injury.*

PEDIATRICS Vol. 111 No. 6 June 2003

"Our results support a recommendation for universal screening in neurologically asymptomatic abused children with any of the high-risk criteria…"

- **Rib fractures**
- **Multiple fractures**
- **Facial injury**
- **Young age (less than 1 yo)**

Brain Imaging

- Imaging in acute setting to rapidly detect treatable conditions (CT)
- Subsequent studies (MRI) designed to
  - more fully delineate all abnormalities,
  - determine the timing of the injuries, and
  - monitor their evolution.

Bleeding/Bruising

- Hgb, Hct, Platelet count
- PT/PTT/INR
- As indicated:
  - PFA
  - DIC panel
  - Factor levels (8,9,13)
  - vonWillebrands
  - CPK
  - UA
  - Hemoccult stool

Screening for other forms of maltreatment

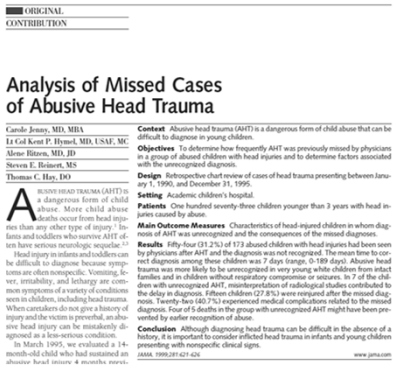
- Urine Drug Screen
- Specific Drug levels based on history
- Trace Evidence Collection Kit

The detection and diagnosis of child physical abuse depends on clinician's ability to

- Recognize suspicious injuries
- Conduct a careful and complete physical examination with judicious use of auxiliary tests
- Consider whether the caregivers' explanation is supported by characteristics of the injury and child's developmental capabilities

Elements of history concerning for abuse

- No or vague explanation for significant injury
- An important detail changes dramatically
- Inconsistent with injury pattern or severity
- Inconsistent with child's physical or developmental abilities
- Inconsistency between witnesses/caretakers



ORIGINAL CONTRIBUTION

Analysis of Missed Cases of Abusive Head Trauma

Carole Jenny, MD, MBA
Lt Col Kent P. Hymel, MD, USAF, MC
Alene Ritzen, MD, JD
Steven E. Reinert, MS
Thomas C. Hay, DO

Context Abusive head trauma (AHT) is a dangerous form of child abuse that can be difficult to diagnose in young children.

Objectives To determine how frequently AHT was previously missed by physicians in a group of abused children with head injuries and to determine factors associated with the unrecognized diagnosis.

Design Retrospective chart review of cases of head trauma presenting between January 1, 1990, and December 31, 1995.

Setting Academic children's hospital.

Patients One hundred seventy-three children younger than 3 years with head injuries caused by abuse.

Main Outcome Measures Characteristics of head-injured children in whom diagnosis of AHT was unrecognized and the consequences of the missed diagnoses.

Results Fifty-four (31.2%) of 173 abused children with head injuries had been seen by physicians after AHT and the diagnosis was not recognized. The mean time to correct diagnosis among these children was 7 days (range, 0-189 days). Abusive head trauma was more likely to be unrecognized in very young white children from intact families and in children without respiratory compromise or seizures. In 7 of the children with unrecognized AHT, misinterpretation of radiological studies contributed to the delay in diagnosis. Fifteen children (27.8%) were reinjured after the missed diagnosis. Twenty-two (40.7%) experienced medical complications related to the missed diagnosis. Four of 5 deaths in the group with unrecognized AHT might have been prevented by earlier recognition of abuse.

Conclusion Although diagnosing head trauma can be difficult in the absence of a history, it is important to consider inflicted head trauma in infants and young children presenting with nonspecific clinical signs.

JAMA. 1999;281:621-626

ABUSIVE HEAD TRAUMA (AHT) IS a dangerous form of child abuse. More child abuse deaths occur from head injuries than any other type of injury.[1] Infants and toddlers who survive AHT often have serious neurologic sequelae.[2,3]

Head injury in infants and toddlers can be difficult to diagnose because symptoms are often nonspecific. Vomiting, fever, irritability, and lethargy are common symptoms of a variety of conditions seen in children, including head trauma. When caretakers do not give a history of injury and the victim is preverbal, an abusive head injury can be mistakenly diagnosed as a less-serious condition.

In March 1995, we evaluated a 14-month-old child who had sustained an abusive head injury 4 months previ-

Missed Diagnosis

- 31% of children with AHT were initially misdiagnosed
  - Younger
  - White
  - Less severe symptoms
  - Live with two biological parents

Table 3. Frequent Erroneous Diagnoses Made in Cases of Missed Abusive Head Trauma*

Diagnosis	No. of Times Diagnosis Made
Viral gastroenteritis or influenza	14
Accidental head injury	10
Rule out sepsis	9
Increasing head size	6
Nonaccidental trauma (not head injury)	4
Otitis media	5
Seizure disorder	5
Reflux	3
Apnea	3
Upper respiratory tract infection	2
Urinary tract infection or pyelonephritis	2
Bruising of unknown origin	2
Hydrocephalus	2
Meningitis	2

Missouri SAFE-CARE Network

- A network of medical professionals trained in the medical response to child maltreatment
- Founded in 1989
- Recent changes to be more responsive to the needs of the individual providers
  - 3-Tiered response system
  - Training
  - Mentoring
  - Peer review

Mandated Reporter (210.115 RSMo.)

" If a mandated reporter has reasonable cause to suspect that a child has been or may be subjected to abuse or neglect, or observes a child being subjected to conditions or circumstances which would reasonably result in abuse or neglect, that person must immediately report or cause a report to be made to the Children's Division."

- Failure to report is a class A misdemeanor.

Legal Responsibilities

Missouri law, at 210.110.(1) RSMo., defines "abuse" as:

". . . any physical injury, sexual abuse, or emotional abuse inflicted on a child other than by accidental means by those responsible for the child's care, custody, and control, except that discipline including spanking, administered in a reasonable manner, shall not be construed to be abuse.

Missouri law, at 210.110.(12) RSMo., defines "neglect" as:

". . . failure to provide, by those responsible for the care, custody, and control of the child, the proper or necessary support, education as required by law, nutrition or medical, surgical, or any other care necessary for the child's well-being."

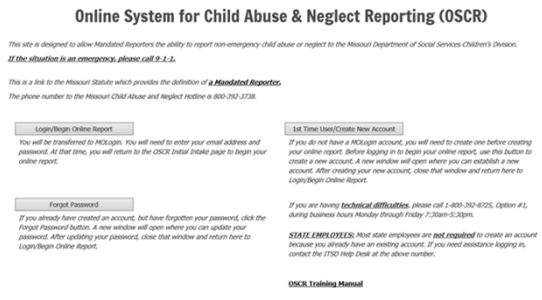
A child is any person, regardless of physical or mental condition, under eighteen years of age. Section 210.110.(4).

1-800-392-3738

- 24 hours a day, 7 days a week, 365 days a year
- Be sure to have:
  - Name of child
  - Name of parents
  - Name of alleged abuser (if known)
  - Where child can be located
- You will be asked:
  - If life-threatening situation now?
  - How do you know?
  - Witnesses? Is so who and how to contact?
  - How to contact you in future

Online System for CAN Reporting

https://apps.dss.mo.gov/OnlineCanReporting/default.aspx



The Child Advocacy Center, Inc.
www.childadvocacycenter.org

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Questions?

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