Sentinel Injuries: Early Warning System for Abusive Head Trauma

Brain Injury Association of NH’s 33rd Annual Educational Conference, May 18, 2016

Gwendolyn (“Wendy”) Gladstone, MD
Debra Samaha RN, MPH

Outline

A. What is a “sentinel injury”?
B. What is the association between sentinel injuries and serious child abuse including abusive head trauma?
C. What does that mean for the progression from little to big injuries?
D. What is being done in New Hampshire to prevent abusive head trauma altogether?

What is “abusive head injury”?

- It’s inflicted head injury with or without impact
- Without impact it’s also known as “shaken baby syndrome”
- “acceleration/deceleration head injury”
- “rotational head injury”
- “whiplash-shaken infant syndrome”
- With or without or unsure if impact: AKA “non-accidental head trauma”
- “inflicted childhood neurotrauma”

Child maltreatment is common

- Each year, authorities prove that 1 in 100 American children are abused or neglected.
- But there are many more cases than that.
- 1 in 8 children is abused or neglected before age 18

Child abuse is serious

- Every day in the US 4 children die of substantiated abuse or neglect.
- More children die of substantiated abuse and neglect than die of cancer.
- The #1 cause of child abuse death is inflicted head injury.

Abusive head injury:

- 95% of serious head injuries in babies are caused by abuse.
- 80% of child abuse deaths are due to head injury.
- 32-39% of identified cases result in death.
- 80% of diagnosed survivors have lifelong impairment:
  - blindness (20% have retinal hemorrhage)
  - impaired ability to breathe, swallow, move, feel, talk, sleep
  - impaired behavior, thinking and learning
Child abuse is a chronic disease
- Adamsbaum 2010: retrospective study of 112 infants with diagnosed abusive head injury
- 29 perpetrator confessions
- All described violent shaking because of frustration with a crying infant
- Shaking silenced the infants and was a repeated act in more than half of the cases
- Some infants were shaken 30 times

Confessions
- "I shook him several times without realizing my own strength. His head snapped back and forth from time to time. I kept shaking him like that he stopped and went to sleep."
- "I was feeling really bad. I was at the end of my rope from not sleeping. I shook him several times a week. I don’t know exactly, always at night..."

The confession literature
- The first one: Caffey 1974
- 15 additional papers
- Covering 40 years
- The common trigger was infant crying

How do we stop this?

Babies are going to cry.

Sometimes an intervention for a sibling results in protection for an infant.
Or a report is made because of domestic violence

Reporting is essential to protect infants at risk.

When anyone suspects that a child has been mistreated they have a duty to report that. Even if they are not SURE.

Reporting to DCYF

- 1-800-894-5533
- If they aren’t open, the report is made to the police department in the town where the abuse occurred.
- You do not need to be sure.

What about HIPAA?

- The responsibility to report child abuse or neglect trumps privacy laws.
- The reported will be protected if the report was made “in good faith”.

Could we recognize it early on?

This is difficult because the perpetrators usually don’t tell anyone what they’re doing... or intimidate anyone who finds out.

The symptoms can be subtle.

- Spitting up
- Poor feeding
- Irritability
- Rapid head growth
- Bulging fontanelle (“soft spot”)
Simon
- Simon is in because he cries and spits up a lot
- His grandmother says he has colic
- He has twice been diagnosed with gastroenteritis
- He has been through 4 different formulas
- He has been on 2 different antacids
- He has had a barium swallow

Then...
- Last evening, his mother fed him around 8 PM and he seemed fine. She then put him down in his crib and went to work.
- Simon’s caretaker reported that when he was checked at 2 AM he was gasping and blue.
- CPR was attempted and 911 was called.

What’s really wrong with Simon?
- He has acute and chronic subdural hematomas from abusive head trauma
- This gives him a headache so he is irritable (plus he is getting slammed around the house)
- And the raised intracranial pressure causes vomiting

Once Simon was stabilized...
His workup revealed:
- A thin layer of blood over the top of his brain
- Diffuse tearing of the nerve cells in his brain
- Severe brain swelling
- Extensive bleeding into the tissue layer at the back of the eyes (the retina)

What happens if the diagnosis is missed?
- It happens commonly; in a study of infants admitted with severe abusive head trauma (Jenny 1999), 30% had been seen by medical providers for symptoms of their abuse and were misdiagnosed.
- In another study (McCain 1993), 1/3-1/2 of infants misdiagnosed and returned to an abusive home suffered further injury and 10% died.
- The diagnosis is more likely missed when there is a Caucasian family with 2 caregivers.

Physical findings can be subtle too.
Lots of KIDS do but almost never BABIES.

- Bruises happen when kids are bouncing around.
- Babies don’t move like that so they seldom bruise.
- A bruise is much more likely to have been inflicted.

Sentinel injuries

- A sentinel injury is an injury caused by abuse.
- It is a sign (“sentinel”) of maltreatment.
- Example: a torn frenulum in a nonmobile infant.

Those that don’t cruise rarely bruise

- Even when the bruise is tiny, it has a big message.
- Some common excuses:
  * her brother did it
  * she did it to herself
  * the dog/cat/toy did it

The TEN-4 rule

- Bruises of the TORSO
- EAR
- NECK
- Are concerning for abuse. Even if they are small and not mentioned by the child or caretaker.
- Bruises in children under 4 months are RARE and when present COMMONLY indicate abuse.

Bruises are the most commonly overlooked signs of abuse

They are often hidden under diapers or underpants.

But it’s so LITTLE!

This infant had multiple fractures.
Patterned bruises

Are bruises that show the imprint of what hit the child. Slap marks are commonly "negative" images.

So are grip marks

ANY bruise in a nonmotile infant should generate an abuse evaluation.

- Only 2.2% of pre-cruising infants have bruises (Sugar, Arch Ped Adol Med 1999).
- If an infant under 6 months of age has a bruise, there is a 50% chance there will be a fracture, head injury of abdominal injury noted on work-up (Harper J. Peds 2014).

Bruising precedes abusive head injury

- Parents of infants without abuse were asked if they remembered any bruising in their infants. None had.
- Parents of infants with abusive head injury were asked if they remembered any bruising on their infants. 27.5% said ‘yes’. These occurred 1 day to 7 ½ months before the head injury was identified. (Sheets et al Pediatrics 2014)

Medical providers miss these red flags.

- 43.5% of these bruises were known to medical providers
- 56.5% didn’t suspect abuse
- 43.5% suspected abuse but most ruled it out because the workup was negative
- But the bruise can be the start of a cascade of injury and should be reported

What can we do for prevention?
The Period of PURPLE Crying®

- Three dose primary prevention program
- Started in New Hampshire after reviewing trauma registry data at Dartmouth Hitchcock Medical Center
- New way to help parents understand infant crying

The word Period means that the crying has a beginning and an end.

3 lines of evidence

Crying and Colic Is Normal

The Most Common Stimulus

Shaking a Baby Is Dangerous

The “Crying Curve”

(Brazelton, Pediatrics 1962)

Large differences from infant to infant

More

Less

Parental Responses to Infant Chimp Distress

[Kard, In Barr et al. (eds.), 2000]

!Kung San Hunter Gatherers

Photos by Marjorie Shostak
A 3-Dose Strategy

Dose 1:
- In the hospital

Dose 2: In the community
- Confirm materials AND education received at hospital
- Review information
- Watch film with them
- Reinforce concepts
- Individual or group settings

Dose 3 – Reach everyone

When Infant Crying is frustrating

Crying, Soothing and Coping: Doing What Comes Naturally

www.purplecrying.info

Mobile/Web Access Code
How PURPLE is New Hampshire

- Currently being implemented in 18 hospitals
- Dose 2 implementers in many communities
- Plan for all 19 birthing units to be reached by end of 2016

Important messages for today:

- Abusive head injury is chronic, tends to worsen over time and can be life threatening.
- Reporting the early signs is essential, even if you’re not 100% positive.
- Eliminating it begins with prevention.

On Father's Day in 2005, Bob Logan was called to Boston Children’s Hospital because his infant grandson was having "seizures."