Traumatic Abusive Brain Injury in Pediatrics
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Objectives

- ✔ Review statistics of abusive brain injury
- ✔ Define and describe TBI as a result of abuse and related injuries.
- ✔ Utilize different screening tools to identify potential TBI abuse
- ✔ Discuss mandated reporting
Terminology

• Non-accidental trauma
• Traumatic brain injury
• Shaken impact syndrome
• Whiplash shake syndrome
• Inflicted neurotrauma
• Inflicted head injury
• Shaken baby syndrome
• Shaken-impact syndrome

• AAP Preferred terminology
  Abusive Head Trauma or Injury [1]
Incidence/Prevalence

- 3.6 million CPA referrals involving 6.6 million children in the US [13]
- 5 Children die each day in the US from abuse and/or neglect. (worst in industrialized nations) [13]
- 2,670 deaths in 2015 (5.7% increase from 2011) [13]
- Medical costs of over $124 billion dollars annually [13]
Incidence/Prevalence

- US rate is 22.5 per 100,000 [13]
- New Zealand is 14.7 per 100,000 [6]
- UK and Ireland is 12.54 per 100,000 [4]
- Canada is 7.6 per 100,000 [12]
- Australia is 6.7 per 100,000 [5]
- Italy is 2.04 per 100,000 [12]
Incidence/Prevalence

• Abusive head trauma is the most common cause of morbidity and mortality in child abuse. [13]
• Abusive head trauma usually occurs in children younger than 1 year of age, but older children can be victims as well. [13]
• 31% of abuse victims are misdiagnosed prior to identification of abuse. [13]
Incidence/Prevalence

- Uncommon for the first instance of abuse to be fatal. [1]
- Usually involves an escalating pattern of abuse (much like domestic violence) [1]
- Most are seen by a healthcare provider prior to the fatal event. [1]
Statistics...

- In 2015, Oklahoma was 1st in the USA for child abuse death rate. [12]
- 17,000 confirmed cases of abuse. [12]
- Oklahoma children are 10 times more likely to be killed by child abuse than other states. [12]
- Average 60 deaths and 140 “near fatalities” annually.
- Mortality rate of 44.8 per 100,000 children.
  - 58% < 1 year [12]
For perspective…

More children die from abuse between the ages of 0-1 years than from all accidental causes of injury [2]

Deaths in Children 0-1 Years of Age 2010 - 2015

- Homicide* (14)
- Fire (1)
- Poison (4)
- Motor Vehicle (4)
Risk Factors

✓ Unrealistic expectations of babies
✓ Young or single parenthood
✓ Stress
✓ Domestic violence
✓ Alcohol or substance abuse
✓ Unstable family situations
  ✓ Poor parent/poor coping skills
  ✓ Poor impulse control [13]
Risk Factors

- Depression / mental illness
- A history of mistreatment as a child
- Child is inconsolable / will not stop crying
- Poor/no support network
- Criminal history
- CYS history
- Low self-esteem [13]
Child Characteristics

- 0-3 years of age
- Drug affected
- Premature birth/NICU stays/multiples
- Acid Reflux (formerly colic)
- Physical disabilities
- Developmental disabilities
- Chronic illness (asthma)
- Emotional/behavioral difficulties
- Unwanted child
- Result of infertility treatment/long-awaited child [13]
Perpetrator Statistics

• Physical abuse:
  • Father (50%)
  • Mother’s partner (22%)
  • Mother (20%)

• “Children living in households with one or more male adults that are not related to them are at 8 fold increased risk for maltreatment injury death.” [10]
Pathophysiology

- Happens when a caregiver violently shakes an infant or young child.
- Only a few seconds of shaking can cause severe injuries.
- Not as much myelin around the individual nerve cells.
- Infant brain is 25% more water than adult. [2]
Pathophysiology

- This shaking causes multiple impacts of the brain and shearing of bridging vessels, subdural hematomas and cervical spine injuries.

- Resulting in cerebral palsy, blindness, hearing loss, learning & behavior problems, seizures, paralysis, and death.

- Those that survive require life long care at a cost of $1.2 million per case. [13]
Subdural Hemorrhage
Rib Fractures

• Posterior rib fractures are caused by violent squeezing of the chest
• Back is unsupported, so that ribs bend back over the sides of the backbone
• Posterior fractures are not a result of direct impact
• Highly specific for physical abuse [2]
Rib Fractures

*(Currie 2014)*
Presentation

- Infants with bruises
- Vomiting without diarrhea
- ***Apparent life-threatening event (ALTE)***
- Sudden increase in head circumference
- Occult (hidden) fracture
- Blood in the mouth (watch for torn frenulum) [2]
TEN-4 BRUIISING RULE [2]

Any bruising of the

- **TORSO**
- **EARS**
- **NECK**

in a child 4 years of age or younger

OR

Any bruising, anywhere, on a child 4 months of age or younger
TEN-4 BRUISING RULE [2]
TEN-4 BRUISING RULE [2]
Mandated Reporting [13]

“Has knowledge of or observes a child in his or her professional capacity, or within the scope of his or her employment whom he or she knows or reasonably suspects has been the victim of child abuse or neglect"

As healthcare providers we are mandated to report SUSPECTED abuse.
Mandated Reporting [2]

- If you suspect, REPORT!!!!
- Proof of abuse is not required.
- Good faith is required
- Investigation by the child welfare professionals or law enforcement.
- Failure to report is punishable by loss of license/credentials and/or prison sentence
Mandated Reporting

Reporting is required by law in:

✦ United States [13]
✦ Canada [7]
✦ England [4]
✦ Ireland [4]
Mandated Reporting [13]

- Reporting is confidential
- May only be disclosed to official agencies and professionals involved in the investigation and/or prosecution.

- Mandated reporters have immunity from criminal or civil liability for reporting as required. (provided good faith)
Case #1

4-month-old baby boy presents for well child exam and is noted to have two fingertip-sized bruises on each thigh. Parents explain that they came from a diaper change when the child was squirming. Social history offers no red flags. The doctor has seen the older sibling for the past two years. [2]
Case #1 Continued [2]

• One week later, the patient was brought to the emergency department unresponsive and having seizures.
• He was found to have bilateral subdural hematomas
• 13 broken bones
• Dad was tearful and outraged when told that someone had harmed his son. (perpetrator)
• Pediatrician described family as “very nice, no concerns.” Under social hx: “Family appropriate.”
Case #2

1 Year girl is brought to a hospital for outpatient surgery for tonsils and adenoids. Upon placing cardiac electrodes on the patient’s chest, clear fingerprint bruising is noted on the child’s torso.
Case #2 Continued

• Police are called and initiate investigation
• Child is taken for the surgery.
• During investigation, female neighbor arrives to visit child/family.
• Is told that she cannot visit due to police activity.
• Female throws her hands in the air and states “I know nothing” and leaves the unit.
Case #2 Continued

• Upon completion of surgery, chief anesthesiologist notes bruising around the child nose, mouth, cheeks and chin from BVM/LMA.
Case #2 Continued

• Chief anesthesiologist orders various blood tests and other diagnostic testing.
• Child is diagnosed with Hodgkin’s Lymphoma.

• Discussion
Prevention

• New York Study [3]
  • Parents are required view a video on shaken baby syndrome before they leave the hospital.
  • Told about resources.
  • Parents were told it was ok to place crying baby on their backs in a crib for 5-10 minutes.
  • TBI rates decreased 47% in three years.
Questions?


References

