Summary of

Physical Abuse of Children

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Case

- 4-month-old male infant is brought to the emergency department by paramedics.
- His mother had dialed 911 because the infant appeared to be limp when she lifted him from his crib after she returned from work; she had left him with her boyfriend while she was at work.
- On arrival in the emergency department, the infant's temperature is 37°C, heart rate 114 beats per minute, blood pressure 90/68 mm Hg, and respiratory rate 28 breaths per minute.
- The physical exam is normal except for decreased muscle tone, and a 1-cm bruise on his left cheek.
- How should this case be evaluated and managed?

THE CLINICAL PROBLEM

- The legal mandate for physicians to report suspected child abuse requires a reasonable suspicion of abuse, which is sometimes a difficult criterion to meet because of uncertainty regarding the diagnosis, particularly when the physician has an ongoing relationship with the family, in which case the physician may want to be more certain of the diagnosis.

KEY CLINICAL POINTS

PHYSICAL ABUSE OF CHILDREN

- Physically abused children, particularly infants, may present with nonspecific symptoms and signs, such as vomiting or apnea; the possibility of abusive head trauma requires consideration in such cases.
- Physical findings, such as bruising of the face, neck, or torso, or intraoral lesions, such as torn frenula, in infants who are not yet ambulatory should arouse suspicion of inflicted trauma.
- The evaluation of infants and young children for suspected inflicted trauma should include a complete physical examination of the child, with particular attention to the skin, oral cavity, and abdomen; imaging of the brain; a funduscopic examination for retinal hemorrhages; a skeletal survey; and measurement of hepatic and pancreatic enzymes.
- Physicians are mandated to report to child protective services cases in which they have a reasonable suspicion of child abuse.

STRATEGIES AND EVIDENCE

Evaluation

- Although abused children may often have injuries to more than one area, some have injuries that are isolated or sentinel (i.e., having the potential to predict a catastrophic event).
- For the purpose of a brief overview of physical abuse, it is useful to categorize injuries into four domains: abusive head trauma, abdominal trauma, cutaneous and intraoral findings, and fractures.
- Table 1 provides a list of the recommended steps that should be taken to assess cases of suspected child abuse.

Table 1. Assessment for Suspected Physical Abuse of a Child.

Step 1: Obtain a careful history of the alleged circumstances surrounding the injury.

- Were there witnesses to the event?
- Who was present with the child when the event occurred?
- Can the alleged event account for the injuries?
- Is the child's developmental level consistent with the proposed mechanism of injury?
- What was done when the event occurred or the child became symptomatic?
- Was there a delay in seeking medical attention?

Step 2: Perform a complete examination with the child fully unclothed.

- Document the overall clinical status of the child.
- Document the presence of any bruises, burns, or other cutaneous findings.
- Document the presence of intraoral lesions by carefully checking each frenulum for injury.
- Document the presence of findings such as subconjunctival hemorrhages.
- Photograph the findings or request that law enforcement obtain photographs.

Step 3: Initiate a diagnostic workup on the basis of the findings and clinical condition of the child. The acuteness of the child's condition and the need for medical intervention may determine the order in which diagnostic studies are obtained.

- Perform CT or MRI of the head.
- Perform CT of the abdomen with contrast enhancement if abdominal injuries are suspected.
- Obtain complete blood count, assess basic metabolic profile, perform coagulation studies, and measure hepatic and pancreatic enzymes.
- Perform a full skeletal survey.
- Perform a funduscopic examination with photographs.

Step 4: Manage any acute medical problem.

Step 5: Notify child protective services as mandated in the state. Notification of law enforcement is also mandated in some jurisdictions.

Step 6: Hospitalize the child if needed.

Step 7: Have hospital personnel or a child protective services social worker perform an extensive social evaluation.

Step 8: Consider an additional forensic workup if indicated or requested or refer the case to a pediatrician, team, or center that specializes in child abuse cases. Additional tests that might be performed include the following:

- A radionuclide scan to look for occult or acute fractures
- A repeat skeletal survey in 2 weeks
- Evaluation for blood dyscrasia
- Evaluation for osteogenesis imperfecta
- Evaluation of other medical problems as suggested by the differential diagnosis of the findings

Abusive Head Trauma

- The term "shaken-baby syndrome" was introduced more than 30 years ago, and since then, vigorous discussion has ensued regarding whether the neuropathologic symptoms associated with the shaken-baby syndrome are attributable to shaking alone or whether a blunt impact is required.

- In a 2009 policy statement, the American Academy of Pediatrics recommended replacing the term shaken-baby syndrome with “abusive head trauma” to avoid the connotation that the mechanism of injury was specifically known for individual cases
- Data indicate a decline in abusive head trauma during the period from 2009 through 2014.
- Infants and young children are at particular risk. Affected infants may have nonspecific symptoms or signs, such as a brief unexplained event that has resolved, apnea, altered mental status, loss of consciousness, limpness, vomiting, seizure, poor feeding, or swelling of the scalp.
- In another study of shaking in which perpetrators admitted to shaking a child, more than a quarter of infant had previously presented with poor weight gain, ecchymoses, and fractures, conditions that were also diagnosed without suspicion of inflicted trauma as the cause
- The assessment of an infant for suspected abusive head trauma should include a thorough evaluation of the skin for bruising, especially the skin of the face, ear, neck, and torso, and an evaluation of the oral cavity (e.g., for a torn frenulum, which might be caused from efforts to silence a crying infant).
- A funduscopic examination should be performed by a pediatric ophthalmologist, and when abnormal, photographs should be obtained to document the presence and extent of retinal hemorrhages
- Retinal hemorrhages are report-ed in approximately 85% of children with abusive head trauma.
- Computed tomography (CT) is recommended if acute neurologic symptoms or signs are present; otherwise, magnetic resonance imaging (MRI) is preferred to avoid the use of radiation, despite the need for sedation in the noncomatose child.
- probability that the injury was related to abusive head trauma on the basis of the presence of six findings: apnea; retinal hemorrhages; rib fractures; long-bone fractures; seizures; and head bruising, neck bruising, or both.
- positive predictive value for abusive head trauma varied from 4% if none of the factors were present to 97% if all six factors were present.

ABDOMINAL TRAUMA

- Isolated inflicted abdominal trauma, although less common than head trauma across all age groups, affects older toddlers (median age, 2.6 years) more often than younger infants and carries a high risk of death because medical care may be delayed or symptoms misdiagnosed.
- Because children with abusive head trauma may have occult abdominal injuries, **the levels of hepatic and pancreatic enzymes should be measured** in cases in which abusive head trauma is recognized or suspected.
- Children with gastro-intestinal symptoms, abdominal pain, or elevated enzymes should be evaluated by CT with intra-venous administration of contrast material.

CUTANEOUS AND INTRAORAL FINDINGS

- Bruises are common in young, mobile children and do not necessarily indicate inflicted injury.
- Medical conditions, such as coagulopathies or certain genetic disorders, can confer a predisposition to “easy bruisability,” and screening for these disorders is recommended in a child who has extensive or atypical bruising.
- Falls often cause bruises over bony prominences (shins and forehead) but are less likely to cause bruising over areas such as the buttocks, hands, and trunk.
- In addition, a pediatric adage, “Those who don’t cruise rarely bruise,” denotes that bruises, especially on the face or trunk, rarely occur in non-ambulatory infants. Bruises in these areas, as well as intraoral lesions, should be considered to be sentinel findings that arouse suspicion of inflicted injury.
- Patterned bruises that mirror an offending object, such as a handprint or belt mark, are also indicative of an inflicted injury. Inflicted burns from immersion in scalding water or from contact with a heated object may also have a characteristic appearance.

- Previously, bruises were assigned an estimated age on the basis of their color, but subsequent studies have shown substantial variation in the color and duration of bruises

FRACTURES

- Skeletal surveys are recommended in all children 2 years of age or younger in whom abuse is suspected (whether a fracture is specifically suspected or not) as well as in children older than 2 years of age in whom a fracture is present and an inflicted injury is suspected.
- In contrast to fractures in normally active children, fractures in children who are nonambulatory arouse con-cern for inflicted trauma, as do certain types of fractures.
- **Both rib fractures and classic metaphyseal lesions ("chip" fractures or "bucket handle" fractures) are considered to be fairly specific for inflicted injuries.**

Fractures that result from squeezing an infant usually involve the lateral or posterior aspects of

CASE CONCLUSION

- The infant in the vignette has had a brief unexplained event that has resolved and has facial bruising, findings that arouse concern for abusive head trauma.
- The infant should be admitted to the hospital and evaluated with an MRI, a funduscopic examination for retinal hemorrhages, a skeletal survey, measurement of hepatic and pancreatic enzymes, and coagulation studies.
- A more extensive social history should be obtained, including who was caring for the infant during the mother's absence and whether other children are in the home (Table 1). The case must be reported to child protective services. All findings should be recorded meticulously in the infant's medical record.