You Can’t Make This Up:
Unusual, Interesting & Sometimes Bizarre Cases of Suspected Abuse

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Disclaimer: Video clip and images

This presentation is meant for mature audiences only as it contains:
• Violence
• Images of abuse
Case – 13 y.o. male

- Child, 15 y.o. brother, and 9 y.o. sister went to an Elementary School near their home to play.
- 15 y.o. telephoned mother 20 minutes later stating “I stabbed them. I stabbed them.”
- Child suffered 15 stab wounds
- Sister suffered stab wounds to scalp
  - sutured in ED
  - released

History from child

- No concerns that brother was going to hurt him.
- “He’s a good kid.”
- Brother “choked” him at age 10.
- Worries that his brother doesn’t love him.
- Doesn’t want to see his brother.
History from mother

- Entire family had COVID.
- After a few weeks 15 y.o. came to mother as he was hearing voices.
- Saw pediatrician:
  - Referred to psychiatrist – dx psychosis started meds
  - Referred to therapist
- Parents had him evaluated by a Neurologist
- Day of incident had therapy session with no concerns

Lansdale teen charged as adult in stabbing of siblings to seek transfer to juvenile court

COVID-19 Psychosis

- 3/1/2020 – first COVID-19 reported in. New Rochelle
- 3 cases of asymptomatic individuals with new onset psychotic symptoms – tested + for COVID
  - Severe anxiety/agitation, paranoia, disorganized thinking
  - 2/3 Auditory hallucinations
  - All elevated CRP and negative head CTs
  - All responded to antipsychotic medication

Case - 4 week old male

History provided by father:
1. Infant was sucking on a pacifier ready to fall asleep.
2. Spit out pacifier & spit up blood.
3. Mother was in shower.

History provided by mother:
1. Noticed bruising on cheeks 4 days prior.
2. Family history of excessive nose bleeds & easy bruisability.

Initial exam at outside ED

- Bruise on right cheek
- Laceration hard palate
- Labs:
  - CK (H)
  - WBC (H)
  - AST, ALT (mildly H)
Further evaluation

- Seen by PCP 1 week prior:
  - “intact palate”
  - “skin normal”
- Head CT, Skeletal Survey, Abdominal Ultrasound – normal
- Coagulations studies, Von Willebrand Profile, Factor IX, Factor VIII, Factor VIII inhibitor – normal
- CK and LFTs repeated next day - normal

TEN4FACESp

- Torso - chest, abdomen, back, buttocks, GU, hip
- Ear
- Neck
- 4 – bruising anywhere on a ≤ 4.99-month-old infant
- Frenulum – bruise or tear
- Angle of the jaw
- Cheeks (fleshy)
- Eyelids
- Sclera or sub-conjunctival
- P - patterned

Validation of TEN-4-FACESp

- Prospective cross-sectional study at 5 urban children’s hospitals Emergency Departments.
- 2161 patients ≤ 4 years of age enrolled.
- Expert panel classified 410 (19%) as abuse and 1713 (79%) as non-abuse.
- TEN-4-FACESp was 96% sensitive and 87% specific for distinguishing abuse from non-abusive.

Pierce MC et al. Validation of a Clinical Decision Rule to Predict Abuse in Young Children Based on Bruising Characteristics. JAMA Network Open. 2021;4(4):e215832
Identifying Potential Child Abuse through Oral Exam

• Oropharyngeal impalement injury accounts for 1-2% of all pediatric trauma.
• Intraoral and facial trauma are reported in up to 49% of infants and 38% of toddlers who are physically abused.
• Proposed mechanisms of injury include forced feeding, gagging, or direct blow to the area.
• Children < 2 are at the highest risk of oral and facial injuries due to abuse:
  – facial bruises
  – fractured or avulsed teeth
  – fractures of the mandible or maxilla
  – lacerations to the lips, frenula, and tongue

Printz JN et al. Case Reports in Pediatrics Published 2 April 2017

Outcome

• CPS took emergency custody.
• Infant placed in kinship foster care.
• Police discovered very long and very hard medicinal dropper - ? cause

Case – 16 m.o. male

• Toddler was seen by mother before she laid down for a nap.
  – Only noted “typical bruises” on shins.
• Boyfriend babysat him for 1 hour.
  – Put down for a nap.
• When child awakened from nap, mother noted bruising, & wax + blood from ear.
• Mother unaware of any trauma.

***Mother is pregnant with fiancé's child.
Hospital evaluation

- CK – 878 (< 351)
- Head CT – normal
- Skeletal survey – normal
- MRI cervical spine:
  - Edema right dorsal paraspinal muscles from C7 to T5

Bunk Bed related injuries treated in EDs

- Used National Electronic Injury Surveillance System database 1990-2005
- 2988 cases < 3 years old
- Most injuries occurred in 3-5 age group
- Lacerations > contusions/abrasions > fractures
- Children < 5 years were more likely to sustain head and neck injuries
  - Concussions were responsible for 37.9% of head and neck injuries, followed by lacerations
  - Lacerations - face, head, & neck

Outcome

- CPS took custody of child.
- Placed in Foster Care.
  - “Doing great.”
- 5 year old seen at CAC for forensic interview.
  - Child was coached.
- On going criminal investigation.
Case – 21 m.o. male

History provided by mother:
1. With 7 y.o. old sister in between, 3 y.o. sister threw tablet at him while in car seat
   - Suffered 2 big bumps on either side forehead
2. Next day left him home with boyfriend (of 6 months)
   - Bruises on cheeks, unwitnessed fall down attic steps
3. Following day left home with boyfriend

Lab studies
- WBC – 16.1 (H)
- AST – 99 (H)
- ALT – 59 (H)
- CK 609 (H)
- Coagulation studies, platelets normal
Radiologic Studies

- Head CT – normal
- MRI head – effusion right mastoid air cells
- Abdominal CT - normal
- Skeletal Survey - normal

ENT evaluation

- Right perforated ear drum
- Left hemotympanum
- Conductive hearing loss right ear

Eardrum Perforation as Evidence of Child Abuse

Traumatic Perforations:
- Instrumentation
  - Solid: e.g. Cotton swab
  - Liquid: e.g. water skiing
- Burns/caustic Agents - welders
- Blast – War zones
- Compression Injury – strike & occlude external ear canal

Child Abuse

Nigeria 1983-1985

- 14 children
  - All from slapping
  - Sharp pain
  - Left eardrum - pars tensa
  - Mild hearing loss 20-30 decibels

Outcome

- Services in home
- Boyfriend-pending charges

Case – 2-month-old

- History per mother:
  - Infant received shots 1 day prior & was cranky all night.
  - Father was up and had infant sleep on chest.
  - Next day noted bruises.
- Mother photographed images of prior bruising:
  - 35 days prior: bruises left leg
  - 32 days prior: bruises right forearm
  - 26 days prior: bruise to left cheek
  - 4 days prior: bruise on right shin
Studies

• Head CT – normal
• Abdominal/Pelvis CT – normal
• Troponin, PT/INR, PTT, CK - normal
• CBC, LFTs – normal
• Platelets – 368,000

Patterned Bruises From Abusive Squeezing

• Pattern bruised caused by greatest tissue deformation – flexural folds of the hand – imprint
• Skin is squeezed with abusive force – compressive forces – injure capillaries
• extravasated blood - bruise with a branching, Y-shaped, or a scalloped, honeycomb pattern.

The Eye Exam in the Evaluation of Child Abuse

• Causes of subconjunctival hemorrhage in young children
  – direct eye trauma
  – indirect forces to the vessels from sudden increases in intrathoracic pressure compression/suffocation
  – Birth
  – medical disease: including hemorrhagic conjunctivitis, pertussis, or hematologic disorder

Petska HW et al. Pediatric Emergency Care • Volume 00, Number 00, Month 2019
Rib Fractures

- May be found as an incidental finding on chest radiographs.
- Usually children are asymptomatic.
- Often no bruising or swelling.
- Caused by violent grasping of the torso causing anterior–posterior chest compression.

Birth related mid-posterior rib fractures

- Of 158,035 hospitalized full-term neonates from 1997-2004 in Holland – 1174 fractures but no rib fractures
- Of 115,756 live births (5 studies on birth trauma) – no rib fractures
- Sporadic reports on rib fractures in neonates after birth (13 cases)
  - Large neonates with difficult deliveries
  - 7/13 with shoulder dystocia
  - 6 with NVD; all > 4.3 kg
  - 5/6 either shoulder dystocia or clavicle fracture
  - 1/6 was 5.02 kg (> 11 lbs!!)

Characteristics of rib fractures in young abused children

- Retrospective review of 78 abused children age 0-18 months.
- 360 rib fractures were identified on 273 individual ribs.
- 67% left-side rib fractures than right-side fractures (P<0.001).
- Posterior and lateral regions and mid level of the ribcage (Ribs 5 through 8).
- 54% had other skeletal fractures; these non-rib fractures were also predominantly on the left side (P=0.006).
Outcome

• Children and Youth – took emergency custody
• Parents charged
  – Father for causing injuries
  – Mother for failure to protect
• Preliminary Hearing – Judge determined probable cause for trial

6 m.o. female

• Mother provide the following history:
  – Prior to leaving work had lunch with MGM – infant was perfect, moving legs
  – While at work received call from father infant won’t stop crying
  – Mother returns home @ 10 PM, infant asleep
  – Awakens at 3 AM
  – When changed diaper – noticed holding leg funny

Mother questions father

1. Three y.o. sib jumped on infant while in bouncy seat & hit with toy piano.
2. When awakened earlier that day got her leg caught between crib slats.
3. Maybe got her knee stuck in tray of high-chair as bruise on left knee.
Studies

- AST 580 (H), ALT 933 (H), CK 257 (H)
- Head CT – normal.
- CT abdomen – small amount of retroperitoneal fluid/possibly hemorrhage adjacent to the duodenum and aorta.
- Repeat labs later:
  - CK – normal (1 day later)
  - AST 203, ALT 641 (1 day); AST 55, ALT 346 (3 days later).

No more than 2 3/8 inches (about the width of a soda can) between crib slats

Later in evening father tells MD

- I was carrying her down the stairs at around 6-6:30 PM
- Only made it down the first few steps before lost footing and fell
- When asked did he drop infant or was infant in arms, he stated, "Well, a little bit of both, I guess. I tumbled down the steps with her & then fell on top of her.
- Infant cried right away.
- Stairs are carpeted.
Outcome

- Father refused to sign safety plan.
- Mother was “standing by her man.”
- Children removed.
- Preliminary Hearing – Judge determined probable cause for trial.
- Mother just recently filed PFA against father due to he assaulted her.

Femur Fractures Resulting From Stair Falls Among Children

- 29 children 2-36 months with femur fracture from stair fall studied prospectively (corroborated vs. confessed abuse).
- 17 carried by caregiver, 11 individual falls, 1 walker.
- Results:
  - Transverse fractures were more concerning for abuse than were spiral or buckle fractures.
  - Delay in seeking care more common with accidental non-displaced buckle fractures.
  - No evidence that stair falls result in multiple injuries or even multiple bruises.


Case – 10 m.o. male

- The mother provided the following history:
- Father has visitation with son 1 day per week from 4-7 and every other weekend.
- Prior to getting his son, infant was acting completely normal.
- Father telephoned at 4:30 PM saying son was acting strange.
- 6:50 PM mother received text that infant was unresponsive & therefore taking him to ED.
In ED
- Unresponsive, difficult to arouse.
- After ~1 hour was more awake but with truncal unsteadiness.
- Head CT - normal
- Mother concerned father may have given infant something as has a drug history – “meth, oxy, weed.”

Past Medical History
- At 2 months of age while in mother’s care.
- Left unrestrained and unattended in a car seat on kitchen counter.
- Reportedly fell off, sustaining forehead contusion.
- Head CT/skeletal survey negative

Studies
- Drug screen 10 – positive for cannabinoids
- Acetaminophen, Salicylate, Ethanol – negative
- Confirmatory – 27 ng/mL Delta-9-THC-COOH
Examining the relationship between marijuana use, medical marijuana dispensaries, and abusive and neglectful parenting

- Respondents were chosen from listed samples for 50 cities in California.
- Used:
  - Conflict Tactics Scale-Parent-Child Version
  - Multidimensional Neglectful Behavior Scale
- Assessed current marijuana (ETOH) use & physical availability of medical marijuana


Results

- Controlled for income, employment, and education.
- Current marijuana users:
  - engaged in physical abuse more frequently
  - provided adequate supervision
  - less likely to engage in physical neglect

***use of medical marijuana has been linked to increased marijuana poisonings (primarily through ingestion of edibles) in Colorado among children < 12 years (Wang et al. Pediatric marijuana exposure in a medical marijuana state. JAMA Pediatrics 2013;167(7), 630–633).


Unintentional cannabis intoxication in toddlers

- France - child admissions for cannabis ingestion 2004-2014
- 235 children with 71% ≤ 18 months.
- Annual admissions increased by a factor of 13.
- Hashish resin was the main form ingested (72%).
- During the study period
  - national increase in intoxications
  - younger intoxicated children (1.28 ± 0.4 vs 1.7 ± 0.7 years, P = .005)
  - more comas (n = 38) [P = .05, odds ratio 3.5 (1.02–11.8)].
  - Compared with other intoxications, other PED admissions, and the same age population, cannabis-related admissions were greater.

Pathophysiology

• Following oral ingestion:
  – cannabinoids are slowly absorbed by the gut
  – metabolized in the liver (blood concentrations 25-30% < obtained through smoking).
  – delay in the onset of symptoms (2-6 hours)
  – prolonged effect due to slow absorption by the gut.
• Metabolites are excreted from the urine (25%) and the stools (65%).
• As cannabinoids are sequestered in fat - second phase of release into the bloodstream that prolongs complete clearance.

Pathophysiology continued

• Injection of THC into spinal cords of mice causes seizures (mediated through cannabinoid receptor Type 1)
• Use of synthetic cannabinoids or toxic exposure of marijuana has caused seizures in adults.
• Seizures result from increased proportion of Δ9-THC to cannabidiol in the products.
• With severe ingestions in children, their small size in relation to the dose of marijuana along with a developing endocannabinoid system, might trigger seizures.

Clinical Presentation

• Symptoms:
  – nausea, vomiting, dry mouth, thirst, pallor, hypothermia
• Neurological symptoms:
  – decreased muscular tone, unsteady gait, change in pupillary reflexes, hypothermia, decreased reflexes, irritability, and perceptual disturbances.
• Severe complications:
  – seizures, respiratory depression, or coma
Outcome

• Both parents were drug tested.
• Mother was charged:
  – Endangering the welfare
  – Misdemeanor 1
  – Maximum probation for 5 years (no priors)

Case – 3 y.o. male

Father provided history:
• 3:30 – 4 PM fed child canned ravioli & for a treat 5-6 mixed candies
• Child watched TV in his bedroom until 7:30 PM while father & girlfriend slept.
• Then ate bread for dinner.
• Again watched TV until ~ 10:30-11 PM.

History continued...

• Father went to child’s bedroom to change his clothes for bed
• Child was wearing pants, sweater, and shoes.
• Child was unresponsive when father picked him up.
• Threw water on face.
• Attempted mouth-mouth breathing.
• Drove to Emergency Department.
• Father stated NO drugs, NO ETOH
In Emergency Department

- Carried in by dad administering mouth-mouth.
- Physical exam:
  - Patient in soaking wet top.
  - Rectal temperature: 94.5°F
  - Unresponsive, agonal breathing.
  - Upper airway stridor.
- “Dad denies dumping water on him or patient being exposed to water.”
- Warm saline bolus, warm blankets

Labs

- ABG – pH 7.19, pCO2 59
- Lactate – 4.1 (HH)
- CBC – WBC 26 (H), Hg 10.6/Hct 33 (L)
- CMP – glucose 544 (HH)
- Urine drug screen – negative
- Extended drug screen blood pending

Imaging studies

- XR Neck Soft Tissue – subglottic airway narrowing.
- XR Chest – Mild perihilar peri-bronchial thickening.
- MRI brain, c-spine – normal.
- MRI abdomen – spleen has old infarct vs. contusion + free fluid in pelvis.
Diagnosis?

• Strangulation
  – Respiratory acidosis, agonal breathing/stridor
  – Cluster of petechiae anterior neck
  – Rapid clinical improvement
• Hypothermia??
  – Lack of oxygen to brain
  – Held in cold water

Outcome

• Discharged home to care of mother.
• No contact with father.
• 9 days later expanded drug screen:
  – Fentanyl, blood 0.6 ng/mL (detection limit 0.5 ng/mL)

Fast Forward 1 month later...

• CPS worker at local farmer’s market.
  – witnesses child with father.
• CPS took emergency custody.
• Criminal investigation ongoing.
Case – 14 m.o. male

History provided by father

- Child has gagging and coughing episodes while with mother. She also noted episodes of jerking and eye rolling.
- Father reports that mother has been very overwhelmed & anxious lately.
- Child admitted for bronchiolitis & possible seizures.

While in hospital...

- Overnight did well, now on room air.
- Respiratory therapist noted oxygen was turned on to 1.5 Liter – RN turned off.
- Short while after mother came running out of room exclaiming “help he is throwing up.”
- RN attends to child and he is fine.
- 1 hour later mother hits call bell.

RN details...

- Child actively vomiting while mother holding upright.
- Mother carried unknown object from the crib to her personal bag.
- Emesis has fruity smell. Child was NPO.
- Mother stated must be her fruity lotion or vaping device.
- Child suddenly became obtunded and transferred to PICU.
In PICU...

- Another episode of vomiting, altered mental status, then obtunded – intubated.
- Mother was noted by RN to move video EEG machine away x 2 so child could not be seen.
- MRI/MRA/MRV brain – normal.
- 24 hour video EEG – no seizures.
- Respiratory panel – positive for rhinovirus.
- Rapid urine drug screen – negative.
Toxicology Results

Blood toxicology screen – cotinine
Confirmatory:
Cotinine, serum 299 ng/mL (detection limit is 10 ng/mL)

Urine:
Nicotine – 4,268 ng/mL
Cotinine – 4,140 ng/mL
3-OH-Cotinine – 2147 ng/mL

Case – 4 7/12 y.o. female

• Referred to CAC for evaluation of sexual abuse.
• Child fell on the bar of her bicycle.
• Blood noted on panties.
• Brought to ED – “looks like abuse.”
• Anogenital exam 1 week after report.
Lichen Sclerosus

- Chronic inflammatory disease of skin & mucosa.
- Prepubertal girls & postmenopausal women.
- Pathogenesis unknown.
- Symptoms - pain, pruritus, dysuria, purpura, & spotty bleeding due to fissuring of skin.
- A classic “figure 8” pattern is often seen, involving the labia minora, clitoral hood, and perianal region.


From the mouth of babes...

- When questioned if any adult has ever touched her “fufu” or “butt,” child stated “no.”
- When questioned if her mother ever took pictures of her while on the toilet, mother’s boyfriend takes pictures of her “fufu” while she’s on the toilet with his cell phone.

Good Safety Plans?
Case – 11 y.o. female
Child exhibiting defiant behavior.
• Mother questions child if anyone is sexually abusing her.
• Child stated yes, mother’s boyfriend is sticking his finger in her “vagina” x 7 over past year.
• Mother says she needs proof because child is a “liar.”

3 weeks later
• Boyfriend touches child’s breast & digitally penetrates her in the kitchen.
• Mother was in her bedroom watching.
• Child runs upstairs. Mother tells child that she didn’t see it as something was blocking the camera.
• Mother sends child back to kitchen to move object.
• Mother then saw, “he forced her legs open & put his finger in her vagina.”

Mother telephones 911.
• The police take the video.
• Immediately arrest the perpetrator.
• Send child to Emergency Department.
  – Anogenital examination normal.
• Child is admitted for concerns of safety.
• CPS releases child to mother.
Mother’s history...

- Alone with toddler & 7 m.o. sib.
- After dinner were bathing them together.
- Removed 7-month-old to bedroom to dress and get another towel.
- Left toddler unattended for 5 minutes.
- She returned & noted hot water was “turned all the way up” & child “was squatting inside the tub.”
- Child “cried for a minute.”

Allasio D and Fischer H. *Immersion Scald Burns and the Ability of Young Children to Climb into a Bathtub.* *Pediatrics* 2005; 115:1419-1421

- 176 healthy full term children between 10 and 18 months of age between these two.
- 5% of 10 month olds and 79% of 18 month olds could complete this task.
- Nearly twice as many boys than girls climbed into the tub.
- Of the infants and toddlers who were successful, 73% entered leg first and 27% entered head first into the tub.

Outcome

- Child released home with mother.
- Safety plan – father must supervise.
- 3 months later mother was arrested.
- When detective arrived at home to arrest mother she was home alone with both children.
Mom charged after allegedly burning daughter in scalding water

After taking a polygraph exam as part of the investigation, Norris allegedly admitted that she left the child unattended in the bathtub with the water running for as long as 10 minutes. Investigators said she also admitted to allegedly pulling the girl by her arm down into the bathtub, forcing her to squat in the hot water. Norris allegedly held the girl by the arm for about three minutes, causing the burns, according to police.

Case-10 Year Old Female

• 16% partial to full thickness burns to the anterior and lateral chest/abdomen, the axillary region, proximal arm region, and the left lateral hip due to flame burn injury
• Child reported her 7 year old brother asked her to help him fry diced potatoes on the gas stove
• Parents report they knew the two children were cooking on the gas stove
• Parents downstairs in their bedroom having an “adult conversation”

10 Year Old Female-Case History

• Parents note that they give the kids increasing responsibilities
• 12 yo brother was supposed to be “supervising”, but had recently got into a fight with 10 yo sister and was not in the kitchen
• Parents report hearing screaming and then brother stating that child was on fire
• Father runs upstairs and sees child already running out the door with her shirt engulfed in flame and her armpits on fire
• Child runs to snowbank to extinguish open flame
• Father wrapped her in a blanket and brought inside
10 Year Old Female-Case History

- Mother now present
- Parents take child to bathroom
- Child starts crying when she sees her skin hanging
- Put child in cool bathwater
- Father drives to town (20 plus minutes one way) to get Tylenol
- Child in tub for one hour
- At this point, parents state concern for the extent of her injuries
- Taken to Regional Medical Center
- Transported to trauma center for further management

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10 Year Old Female-Case History

- Child stated she was helping her brother fry diced potatoes
- Leaned forward on the gas stove
- Looked down and saw open flame on her shirt
- She stood up and started crying
- Her brother told her to run to the snowbank to extinguish the flame

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Exam:

- 16 percent TBSA partial to mostly full thickness burns to the anterior and lateral chest/abdomen, axillary region, proximal arms and left hip region
- Concern of unexplained clean lines of demarcation between burned and unburned skin by ICU doctors
- Child Abuse Pediatrics consulted to evaluate for maltreatment

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Scene Investigation

Burn Patterns

- Burn patterns clearly explained by the child's disclosures in combination with photos of her clothing at the scene
- Clean line of demarcation between the burned and unburned skin just below the nipple line is consistent with her bra line. Bra was 95% cotton and 5% spandex.
- Burn patterns in the axillary region are consistent with the flames jumping over the bra line and connecting with the axillary skin, except on the left where the bra melted.
- The clean line of demarcation on the lower abdomen is consistent with her underwear line. Underwear have no signs of injury.
- The Under Armor pants demonstrated a hole on the left side where they melted into the skin on her left hip.

Disposition:

- Child Abuse Pediatrics consult-Definite child neglect (supervisory neglect)
- OCS Investigation-open for supervisory neglect resulting in great bodily harm to the child
- Intensive home safety education with the family
- Discharged into the care of her biologic parents
Supervisory Neglect

- The failure of a parent or caretaker to provide the child with adequate protection from harmful people or situations
- Implies an omission behavior or failure to act
- Evaluation considers 3 sets of factors: the child, the caregiver, and the specific incident
- 10-20% of pediatric burns are the result of maltreatment and 50-90% of these are secondary to neglect


5 Week Old Nonmobile Infant

- Presented to the ED with concern of leg pain
- Day prior, parents report sister jumped on bed where infant lying and landed on her
- Incident unwitnessed
- Right spiral tibial fracture found at military hospital ED
- Transferred to trauma center for further evaluation and care
- OSH suspected nonaccidental trauma

5 Week old Nonmobile Infant

- Prenatal concern of shortened long bones and hip dysplasia
- Consult pending at Children’s Hospital for bone dysplasia evaluation but not done due to COVID-19 travel restrictions
5 Week old Nonmobile Infant

- Bone mineralization studies all normal
- Skeletal survey showed right midshaft tibial fracture with persistent bowing deformity of tibia
- Bowing deformities of the femurs and tibia

Osteogenesis Imperfecta (OI)

- OI is an inherited connective tissue disorder with many phenotypic presentations
- Suffer multiple fractures with minimal/no trauma
- Sixteen types
- Most severe form causes death in perinatal period

- Type I collagen (Col1A) defects
  - Most have an autosomal dominant mutation in collagen type I alpha 1 chain or type I alpha 2 chain that affects the structure of one of the two alpha chains of collagen type I
  - Severity of clinical presentation depends on the effect of the mutation

Excess or atypical fractures, fractures most commonly associated with OI were transverse humerus, olecranon, and diaphyseal humerus fractures, whereas physeal and supracondylar humerus fractures were least likely to indicate OI in one study.

- Short stature
- Scoliosis
- Basilar skull deformities, which may cause nerve compression or other neurologic symptoms.
- Blue sclerae
- Hearing loss (usually detected in later childhood to early adulthood)
- Opalescent teeth that wear quickly (dentinogenesis imperfecta)
- Increased laxity of the ligaments and skin.
- Wormian bones (small, irregular bones along the cranial sutures)
- Easy bruisability
Osteogenesis Imperfecta (OI)

7 Month Old Male Infant

- Presented to the primary care pediatrician for a flu shot, eczema flare and white tissue under the tongue
- PCP diagnosed a lingual frenulum tear
- Parents report bleeding from the mouth 2 days ago with breast feeding
- Refer for child abuse evaluation

Evaluation

- Head CT – Normal
- Skeletal Survey – Normal
- AST/ALT – Normal
Riga Fede Disease

- Traumatic intraoral injury in nonmobile children is highly concerning for child abuse
- Frenulum injuries in particular are highly associated with abuse
- HOWEVER, MIMICS OCCUR
- TRAUMA-NOT A LINGUAL FRENULUM TEAR
- Diagnosis-Traumatic Injury-Not concerning for abuse
- Outcome: Lesion slowly resolved after several months

Riga Fede Disease

- First described in 1881 by Italian physician Antonio Riga and histologically described by Francesco Fede in 1890.
- Characterized by the presence of a traumatic lesion of the sublingual mucosa from rubbing the tongue against the primary mandibular teeth
- Primarily occurs in infants/toddlers after initial eruption of the teeth

7 Week Old Female Infant

- Transferred from outside hospital with left femur fracture
- At 3 weeks of life, infant noted to have redness/swelling of her left knee.
- Admitted to outside hospital and diagnosed with metaphyseal corner fracture of the left distal femoral metaphysis
- HCT negative; remainder of skeletal survey negative
- OCS contacted and after assessment, implemented an in-home safety plan with maternal aunt as custodian and supervisor of all parental contact with infant
Medical History:

- Infant did well in the interim, though parents report the leg swelling never improved.
- 4 weeks later, developed increased swelling of her left leg along with a return of the redness on her medial left knee, prompting return to the emergency department.
- Parents describe redness as hot and firm to the touch.
- Admitted to OSH where a follow up x-ray revealed a possible enlarging hemarthrosis or joint effusion, and possible atypical periosteal reaction. Vomiting.
- Transferred to tertiary referral center due to difficulties maintaining IV access for needed antibiotics.
- Has never had a fever per parents.

Social History:

- Only child
- Parents married
- Dad in military. Mom a domestic executive, but trained as an EMT.
- Custody hearing in one week, where parents report OCS will take custody of child

Exam:

- Well nourished 7 week old female
- Decreased movement of the left lower extremity. Left thigh and knee are swollen in appearance when compared to the right. There is full range of motion of the left knee and palpation and range of motion do not appear to cause increase in discomfort.
- No concerning lesions or contusions noted
Labs:

- WBC: 6.4 Low (8.1-15)
- CRP: 2.18 Elevated (0.08-1.58)
- Sedimentation Rate: 29 (0-10)
- AST: 71 Elevated (11-61)
- ALT: 77 Elevated (26-61)
- BUN/Creatinine Ration: 40 Elevated (10-20)

Case Management/Disposition:

- Confirmed to have osteomyelitis due to staphylococcus aureus
- Discharged into the care of her parents
- OCS to discontinue in-home safety plan
- Case resolved
- Parents consented to publication of case in hopes of educating others

Osteomyelitis in Infancy

- In the United States, there has been a 2.8-fold increase in the incidence of osteomyelitis in the past 2 decades.
- Most common organism that infects the bones is Staphylococcus aureus, followed by the respiratory pathogens Kingella kingae, Streptococcus pyogenes, and Streptococcus pneumoniae.
- Methicillin-resistant S aureus (MRSA) accounts for 30%-40% of osteoarticular infections in the United States and a lower percentage of cases in northern Europe and the Middle East.
- The course of community-acquired S aureus osteomyelitis appears to be more severe in recent years, primarily in cases caused by MRSA.
- In the past 10-15 years, increase in the recognition of K kingae as an infecting organism. In Europe and the Middle East, K kingae now is the most common pathogen in young children with osteomyelitis or septic arthritis.

16 Month Old Male

- Brought to ED ~24 hours after burns to lower legs
- HX: mother boiled water for cleaning, poured into bucket, turned back, found baby sitting in spilled water on floor

Medical History:
- Born at 35 weeks; NICU for a few days for feeding issues
- Influenza A, pneumonia age 7 months

Social History:
- Lives with mother who is pregnant & his 6 y.o. half brother
Labs

- Albumin, total protein low (2.6/5/6)
- Glucose elevated @ 146
- Remainder of CMP nml
- WBC 25.7 w/left shift
- F/U CBC nml WBC but H/H low 9.5/30.2

Imaging Studies:

- Skeletal survey: no fractures seen

Case Outcome

- Inpatient in Burn Unit for months followed by extensive rehab
- OCS, LE actively involved
  - Additional concerns for NAT based on investigation
  - OCS interviewed child’s brother, who said Mom was mad that child pooped and put in tub causing burns
Child Torture Definition

Child torture is defined medically as:
- At least two physical assaults, occurring over at least two incidents or a single extended incident, which would cause prolonged physical pain, emotional distress, bodily injury, or death
- At least two elements of psychological abuse such as isolation, intimidation, emotional/psychological maltreatment, terrorizing, spuming, or deprivation

Inflicted by the child's caretaker(s)
Neglect is usually present, and manifests as failure to seek appropriate care for injuries and/or malnutrition

Resulting in: prolonged emotional distress, pain and suffering, bodily injury/disfigurement, permanent bodily dysfunction, and/or death

5 Year Old Male

- Reported missing at 9 am by father
- Said missing from house at 8 am
- Put to bed night before at 9 pm
- Mom last saw at 11:30 pm
- Home searched next day at 4 pm. No child found.
- Mom noted to be in hotel 6 days prior

Common Abuse Manifestations Include, But are Not Limited to:
- Physical assault: hitting, kicking, impacting against objects, beating with objects, tying, binding, gagging, stabbing or cutting, burning, breaking bones, exposure to prolonged environmental heat or cold, prolonged forced exercise, forced restraint in or maintenance of an uncomfortable position, forced ingestion of noxious fluids, dangerous materials or excrement, aggravating the pain of prior injuries
- Isolation: removal from school or outside activity, restriction of peer contact, hiding from outsiders, imprisoning alone and/or in tightly confined spaces restricting movement
- Intimidation or emotional/psychological maltreatment: Repeated intimidation or humiliation, cursing, derision, threatening harm to or harming loved ones, pets or loved objects, spuming, terrorizing
- Deprivation: deprivation of food, water, or sleep, forced to wash while others eat or drink, punishment for seeking basic needs, deprivation of safe and hygienic excretory function, neglect of medical needs, neglect of mental health needs, deprivation of education, deprivation of human contact
5 Year Old Male

- Reported by Mom to have fallen down stairs while sleepwalking and spilled hot water on himself
- Notepad in home said “research on child” with ODD written on it

Injuries at Autopsy

- Multiple blunt force injuries to the head, torso and extremities
- Severe swelling of head soft tissues with multiple bruises and abrasions
- Severe swelling of the brain with herniation
- There was blood on the head and in the mouth and nose
- The eyes were swollen shut
- There were contusions on the right side of the face and above and below the left ear
- Abrasions on the right side of the head, forehead, left side of the head, back of the head, and top of the head
- Indentation in the scalp on the left side of the head
- Abrasion of the nose
- Outer lips were contused
- Upper and lower frenula inside the mouth were hemorrhagic
- Patterned injury of small circular lesions on the central forehead
- Multiple abrasions and contusions of the torso and all four extremities
- Bilateral inhaled blood in the lungs
- Old fracture of the left first rib with callous formation

5 Year Old Male

- Physical Beatings
- Burn Lesions
- Terrorizing
- Spurning
- Isolation
- Medical Neglect
5 Year Old Male

Diagnoses:
- Acute physical abuse/blunt impact injuries
- Chronic physical abuse
- Psychological abuse
- Medical neglect
- Child torture as a form of child abuse

Siblings

- 65% of siblings were abuse victims themselves
- 45% of victim's siblings had been coerced into participation in the torture
- Victim as scapegoat

Torture Perpetrators

Common perpetrator manifestations:
- Typically both adult caregivers are involved in the torture to some extent
- Women figure much more prominently as perpetrators of torture than in other forms of physical abuse
- Siblings are aware of and may be coerced to participate in the abuse, and also may be abused to a lesser degree

All adults in the household knew of this extreme abuse and participated to some extent in the abusive acts
Torture Perpetrators

• 79% of the primary abusers were not the child’s first degree relative (adoptive parents, step-parents, boyfriends, girlfriends, aunts, uncles, grandparents)
• Females were among the perpetrators in every case
• 39% were the biologic mother or father
• Most perpetrators of torture partially confess to the crime, but minimize or rationalize individual involvement

Torture Perpetrators

• Perpetrators demonstrated little or no remorse
• Many transferred blame onto others or blamed victim for precipitating the abuse or causing abuse to be necessary
• Utilized a framework of necessary discipline and corporal punishment to justify their abusive acts

The never ending case(s)
Questions?

Thank you!

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