



Accident or Abuse?

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Two month old with a fall



History

- A two month old infant is brought to the ED after falling from a bed to the floor.
- The mother was sleeping when this occurred and the father was working that night.
- When the father returned home, he found that the baby had a bruise on the face.

* Note that the history was changed for educational purposes and to protect confidentiality.

Accident or Abuse



Which of the following is most likely?

- Accident
- Abuse



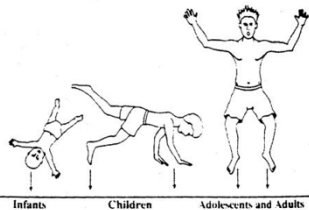
Areas where bruising is uncommon



- Sugar and colleagues recorded bruising in less than 2% of children, at any developmental stage on the back, buttocks, forearm, face, abdomen or hip, upper arm, posterior leg, or foot . Confirmed in other studies.
- Wedgwood noted bruising to the lower back in the very mobile child, but he saw none in early walkers, cruisers, or pre-cruisers. Forearm bruising was not seen in the cruising and pre-cruising group.
- There was no bruising to the hands in children less than 4 years old recorded in any study. Dunstan and colleagues found no bruising to the ears.

Maguire S, Mann MK, Sibert J, Kemp A. Are there patterns of bruising in childhood which are diagnostic or suggestive of abuse? A systematic review. *Arch Dis Child.* 2005 Feb;90(2):182-6.

Drawing of Fall Mechanics



Sawyer Jr, Flynn Jm, Dormans JP, Caaloan J, Drummond DS. Fracture patterns in children and young adults who fall from significant heights. *J Pediatric Ortho.* 2000; 197-202.

Acute Head Trauma

Sugar F, Taylor JA, Feldman KW. Bruises in infants and toddlers: Those who don't cruise rarely bruise. *Arch Pediatr Adol Med.* 1999; 153:399-403.

- Bruises in 434 well children studied.
- Bruises on the back, forearm , or face were noted in less than 2% of the walking children, but were extremely rare in precruisers and cruisers.

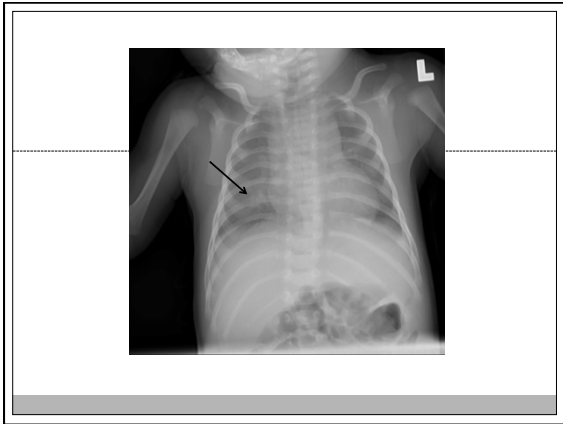
Work up for Physical Abuse

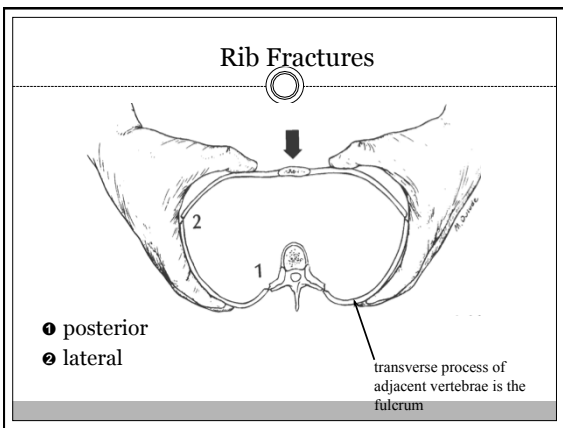
Diagnostic Tests to Consider:

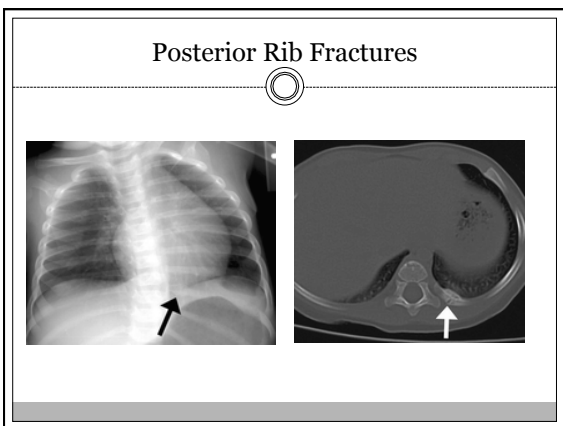
- CBC with platelets, LFTs, amylase/lipase, PT/PTT
- UA and stool guaiac
- UDS/Toxicology
- Skeletal Survey with oblique views of ribs
- Brain imaging (CT acutely; MRI for follow-up)
- Forensic Evidence Kit per SANE consult

Labs

- PT/PTT normal
- SGPT slightly elevated at 60
- CBC normal, with normal platelets
- Urine Drug Screen not performed







Rib Fractures

Rib Fractures In Child Abuse

- The most common type of rib fracture resulting from child abuse is posterior rib fracture, where the rib head articulates with the vertebral body.
- Rib fractures are commonly asymptomatic with no signs of external trauma, and therefore, may be missed if there is not an index of suspicion or other reason to obtain chest or rib films.
- Rib fractures generally are not displaced or fragmented, and therefore, may be undetected on plain film until callus formation occurs at 7-10 days after injury.
- Birth injury rarely, if ever, causes rib fractures.
- Rib fractures in young infants are very nearly diagnostic of child abuse.

Rib Fractures

Clinical Bottom Line:


- In children with rib fractures, the likelihood of non-accidental injury decreases with increasing age.
- Rib fractures in children less than 3 years of age are highly predictive of non-accidental injury.
- The absence of a rib fracture on a chest radiograph in a child does not rule out non-accidental injury.

Barsness KA, Cha ES, Bensard DD, et al. The positive predictive value of rib fractures as an indicator of nonaccidental trauma in children. *J Trauma*. 2003;54(6):1107-1110.

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Which of the following is most likely?

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Acute Head Trauma

Jenny C, Hymel K, Ritzen A, et al. Analysis of missed cases of abusive head trauma. *JAMA*. 1999; 281(7):621-626.

- 54/173 infants seen by their physicians and diagnosis missed
- Mean time to correct dx was 7 days
