Pediatric Radiology’s Role in Child Abuse

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How pediatric radiologists can identify and address child abuse.

An estimated 124,544 children were reported as physically abused in the U.S., according to a 2012 report from Department of Health and Human Services. Almost 25% of these children are younger than age two.

Pediatric radiologists have a unique role in diagnosing child abuse, as sometimes the children come for imaging when ill with a natural cause and the child abuse injuries are incidental findings, and sometimes they come for imaging because of their abuse injuries. The pediatric radiologist’s role in child abuse is important, but fraught with implications for the family and child, whether the abuse is correctly diagnosed or misdiagnosed.

**When to Suspect Child Abuse**

What makes a pediatric radiologist think about child abuse versus another cause of injury? One of the triggers is an injury that doesn’t fit with the mechanism or history given. There might be a femur fracture in a child younger than age 1, who isn’t expected to be ambulating at that age. The parent might tell the clinician that the child rolled off the bed or a sibling threw something at the child.

“Oftentimes that would make the referring health care provider suspicious," said Sabah Servaes, MD, chair of the Child Abuse Imaging Committee of the Society for Pediatric Radiology, and the director of Body CT in the Department of Radiology at The Children's Hospital of Philadelphia.

Certain fractures are not typical in children younger than two, like rib fractures. “Children have a (relatively) plastic skeleton. We don’t expect rib fractures, even if they’ve undergone CPR,” she said. Also suspicious in children who are younger than two are classic metaphyseal lesions. Injuries like this might be caused by shaking a child.

The classic metaphyseal lesions at the end of the long bone are next to the growth plate, and there’s evidence that they’re strongly associated with child abuse, she said. An older child is unlikely to be traumatized this way, because they can prevent their limbs from having that kind of whiplash fracture.

Servaes said that fractures in multiple stages of healing are another clue, for example a healing rib fracture in addition to an acute femur fracture. This indicates the child might be undergoing repetitive trauma.

Another area of concern is head trauma. “Maybe the child has a fracture or there’s a bump on the head,” she said. When reading a head CT, she might see blood overlying the brain in the extra-axial space. It isn’t typical to see head fracture like this at a young age, or blood in the brain, however they do occur outside of abuse cases. She cautioned that injuries like falling down the stairs or accidentally being dropped can cause these findings, and birth trauma can also account for blood in the extra-axial space.

While some injuries are more typical in younger children, any type of fracture can be seen in a child abuse case, particularly in older children, Servaes said. It can be harder to determine injuries due to abuse in older children, though. A rib fracture might be from a contact sport, for example. However,
older children usually have better verbal skills and may be able and willing to tell someone about the abuse. Imaging older children with developmental problems makes it tougher to know the injury cause.

**If You Suspect Child Abuse**

Sometimes the radiologist is the first one to suspect a case of child abuse, like if a patient comes in for an illness or other problem, and the referring physician isn’t aware there’s a fracture. If she feels additional studies are needed, Servaes will ask the referring physician to order them. “Usually if I find something that is suspicious, people are very cooperative in ordering additional appropriate studies.”

Most of the time, Servaes said, the child abuse is suspected before she sees the imaging, and the referring doctor orders a skeletal survey. “I have had that [happen] more than finding something incidentally,” she said. However, “we’ve done abdominal X-rays and seen healing rib fractures and brought that to the attention of the referring doctors.”

The day of her interview with *Diagnostic Imaging*, Servaes said she saw a skeletal survey because the child sustained a head injury. “Oftentimes that’s what happens. A child is brought in for some issue and it necessitates some imaging. We see something suspicious or unexpected and we pursue more. Head injuries are the biggest trigger that alert people,” she said.

According to the American Academy of Pediatrics, the role of imaging in child abuse is to “identify the extent of physical injury when abuse is present and to elucidate all imaging findings that point to alternative diagnoses.” Often the radiologist doesn’t meet the patient or family, but reads the history given to the technologist. “I leave that to the people who have a rapport with the family to ascertain what happened. One of the frustrations that patients have is that they tell the story over and over again,” Servaes said. If she has questions, she’ll reach out to the referring physician to ask for more information. “It’s important to make the diagnosis and it’s important not to make a misdiagnosis.”

As for reporting the suspected abuse to authorities, “talking to the referring health care provider is usually where my responsibility is,” she said. “It can be trickier if it’s an outpatient coming in with a family member and I see something suspicious.” If she can’t reach the outside physician, she’ll keep the family and child at the hospital while awaiting further instructions. “If I can’t reach that person, I resort to sending them to the emergency department, and tell them we need to investigate something further.” The emergency room physician and hospital team then take over.

**Resources**

The ability to tease out an injury from child abuse versus another cause is vital. Here are some additional resources for child abuse imaging:

- Two radiologists gave a CME course with imaging examples for the Society for Pediatric Radiology in 2014 on determining child abuse from imaging.
- Resources recommended by Pediatric Radiology.
- ACR Appropriateness Criteria for child abuse imaging.
- ACR and SPR parameters for pediatric skeletal surveys
- Upcoming meeting: AP-SPR Imaging of Child Abuse: Exam Room, Reading Room and Court Room February 26-28, 2016; Hilton Orlando Lake Buena Vista

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