The Classic Metaphyseal Lesions Myth in Child Abuse Prosecutions: Time for Law Enforcement to Challenge the Treating Doctors Before Pursuing Charges.

Soon we will see that the urban legend of radiographic evidence of child abuse proven just that – nothing but legend. Since 1946 – and more so since 1986 – the pediatric and radiological medical community has been taught and come to believe as gospel that there are certain fractures in children that are pathognomonic of child abuse. Described as a bucket handle or corner fracture because of how they allegedly appear on x-ray films, peditaricians, radiologist, nurses, police officers, prosecutors, judges and social workers are taught that these fractures are highly specific of child abuse. These alleged fractures have become known as "classic metaphyseal legions" or "CML", a phrase coined by Dr. Paul Kleinman in his 1986 article "The Metaphyseal Lesion in Abused Infants: A Radiologic-histopathologic Study." AJR 196; 146:895-905.

For at least the past two decades though, this assumption has routinely been challenged. And with the advent of better and more available bone imagining tools, the evidence is proving that not only are these alleged fractures not evidence of abuse – but they are not in reality fractures at all.

Sadly though, the CML legend remains the medical standard. So at best, the issue becomes a battle of experts. Unfortunately for the criminal defendant – often an honest loving parent – the cost to identify and acquire the various medical experts can amount to tens of thousands of dollars. And, a typical criminal defense lawyer may herself be undereducated on the topic so much so as to not know what medical evidence to have evaluated and by which medical specialty. These fracture cases involve in the least adult and pediatric genetics, pediatrics, radiology, bone specialists and histopathology – not to mention the lab testing and additional radiology that is necessary to design a sophisticated defense. And, without that understanding, often the criminal defense lawyer herself may not request from the Court funds for the appropriate expert consultants and witnesses.

The government though has the treating doctors as their experts at no cost to prosecute felonious assault and felony child endangering charges. This expert testimony generally goes unchallenged by the police investigators. Even worse, the parent will not have had the opportunity to review the medical records, identify experts and obtain medical expert reports until well after having been publically accused and charged criminally of abusing a child.

Even if criminal charges are not filed, the government typically petitions the Court for a finding of abuse. Ohio has Section 2151.031 of the Ohio Revised Code. That provision, like most states, allows an inference that a child was abused where the parents cannot provide an explanation for the injuries.

A very typical child fracture case finds itself to the attention of law enforcement when parents self-report the child to a pediatrician or emergency department with some apparent injury or difficulty a child seems to be experiencing. The child generally has no external evidence of

injury or abuse, e.g. no bruising, swelling, or scrapes. There is almost always no witness to any actual abuse. With the routine examination or x-ray, multiple alleged fractures are identified and the child is immediately placed in protective care.

The parents are shocked and heartbroken to hear the diagnosis of multiple fractures. The shock is matched by their confusion. They are immediately subject to questioning by law enforcement. They often do not understanding that the officers are investigating them as suspects of the alleged abuse. When the parents have no explanation for the alleged fractures, the investigators immediately presume abuse as there was no other reasonable explanation for the fractures offered by parents. Never though do the doctors, nurse or police officers explain that there is debate among medical professionals as to whether these bucket handle and corner fractures actual exists.

Ignore for the moment how complicated is the growth of young bone, the suspicion that healthy and happy parents would cause such abuse is unique to only these child fracture cases. It is sadly though the heart of the problem with such cases. As Dr. James LeFanu wrote that "[t]he diagnosis of fractures must be highly improbable in the absence of the relevant clinical signs of injury. It seems highly improbable that a small baby who has allegedly been the victim of repetitive physical assault should nonetheless appear well with no physical stigma of injury such as bruises or soft tissue injury other than the presenting injury." LeFanu, James, M.D., The Misdiagnosis of Metaphyseal Fractures: A Possible Cause of Wrongful Accusations of Child Abuse, Nov. 25, 2009. The finding of abuse in such cases is saying only that the parents are, in the words of Dr. Marvin Miller, "deceptive parents who have maliciously designed a way of repeatedly injurying the bones of their child without leaving any telltale traces of injury to the skin." Miller, Marvin, MD, The Lesson of Temporary Brittle Bone Disease: All Bones are Not Created Equal, Bone 33 (2003) 466.

Why then is this the accepted belief among doctors, nurses, social workers, prosecutors, police officers and judges? In 1995, Dr. Paul Kleinman conducted a study of just 31 deceased infants to in essence prove his 1986 findings. It appears though there is little more to support his findings other than this 1995 article "Inflicted Skeletal Injury: A Post-Mortem Radiologic-histopathological Study in 31 Infants." AJR 1995; 165:647-650. Until recently, there was no comprehensive evaluation of any and all research supporting these CML assumptions.

In 2014, radiologist Dr. David Ayoub, pediatrician Dr. Charles Hyman, histopathologist Dr. Marta Cohen, and pediatric geneticist, Dr. Marin Miller, engaged in a study to "review the hypothesis that classic metaphyseal lesions represent traumatic changes in abused infants and compare these lesions with healing rickets." Ayoub, et al. A Critical Review of the Classic Metaphyseal Lesion: Traumatic or Metabolic?; AJR 202, January 2014. The authors researched the National Library of Medicine for articles addressing the subject of the CML. There were only nine studies in the peer reviewed literature on the subject – they were published between

1986 and 1998 by the same principal investigator, Dr. Paul Kleinman. This is the same Dr. Paul Kleinman who coined the phrase "classic metaphyseal lesion."

The review of Dr. Kleinman's research found that it suffered from a number of defects:

1. There was no control group that tested the prevalence of the metaphyseal lesion in non-abused children.
2. There was little evidence to confirm that there was actual abuse so as to confirm the CML finding was related to abuse. These were not "witnessed abuse" cases.
3. The findings have not been independently replicated in peer-reviewed literature.
4. Pediatricians and radiologists are taught that these fractures are caused by violent whipping of the child. The CML is allegedly a fracture parallel to the chrondroosseous junction – where the bone meets the cartilage. Which is not consistent with the "violent shaking as the infant is held by the trunk and extremities" that Dr. Kleinman proposes to cause the parallel injury.
5. There is typically no evidence of bleeding in near the fracture which is an area that is extremely vascular because of its role bone growth.
6. The radiographic depiction of these CMLs arguably resembles the irregular thickening of the perichondrial ring. That ring surrounds the end of growing bone to provide it protection and support. If the bone grows irregularly, this perichondrial ring can give the impression of a bucket or corner fracture where the diaphysis meets the metaphysis and epiphysis.
7. Last and most important, modern CT and MRI technology is now available to test current x-ray findings – but not available to test old x-ray findings. We cannot go back to old patients and conduct CT and MRI on the patient. When comparing suspicions of fractures based on x-rays to CT scans of the same bone, radiologist are learning that what was suspected as a fracture is instead a bone irregularity or the thickening of the perichondrial ring.

   Remember that understanding the radiographic tools to diagnose these fractures is critical to understanding the reliability of the findings of the radiologist. These are ultimately questions of the mineralization of the bone as mineralization is crucial to bone strength. It is well settled that there must be a loss of bone mineralization of some 20-30% before the demineralization can be detected on a simple x-ray. Hence, with the prevalence of these better imaging technologies, we have a new opportunity to test comparisons between x-ray finds and CT or MRI findings. We do though need a commitment to conduct this research and record the findings as doctors are treating suspicions of abuse in their day to day practices. Without that commitment, we risk losing critical evidence to support findings of past wrongful convictions for child abuse.

With that, Drs Ayoub, Hyman, Cohen and Miller conclude that the decades old presumption that a CML is indicate of abuse "is poorly supported." They recommend that "[u]ntil classic

metaphyseal lesions are experimentally replicated and independently validated, their traumatic origin remains unsubstantiated." Interestingly, one frequent expert witness for the government reported to this writer the preliminary results of his recent study. He described his "witnessed abuse study" – meaning cases where injured children came to the clinic with actual witnesses of abuse. The radiological evaluation of these witnessed abuse patients in his study was not proving to show classic metaphyseal lesions in these patients.

This is nothing new in abuse medicine. The criminal justice system experienced the same medical presumptions with Shaken Baby Syndrome; parents were convicted and imprisoned only for the system to discover later the fallacy of the SBS diagnosis.

On a daily basis there are loving parents accused of injuring a child without any external evidence of injury or witness to abuse. Not only are families torn apart, but the accused parent is convicted and imprisoned for considerable periods. As Drs Ayoub, Hyman, Cohen and Miller suggest we must remain suspicious of the suggestion that these lesions have a traumatic origin.